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Diseases Cancer, Ophthalmology & Pediatric

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Preeclampsia for Maternity Nurses

Highlights

Intestinal Infectious Diseases

Physical Activity in Type 1 Diabetes

Discovering Thoughts, Inventing Future

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Impact of an Educational Program about Preeclampsia for Maternity Nurses on their Performance and Pregnancy Outcomes

By Dr. Elsayeda Hamdy Nasr abdelhalim

Abdulaziz University

Abstract- Background: Preeclampsia and eclampsia are the most common causes of morbidity affecting mothers and their fetus.

Aim: The aim of this study was to evaluate the impact of an educational program about preeclampsia for maternity nurses on their performance and pregnancy outcomes.

Subject and methods: A quasi-experimental design was used. The subjects of the study include two groups as the following: a convenience sample of all nurses (30) who work in the obstetric and gynecological departments in Port Said Hospitals and all inpatient women diagnosed with preeclampsia who attended during the period of the program conduction (20 women).

Results: The results showed that there was an improvement in the nurses' skills in providing nursing care for patients with preeclampsia. Also, a statistically significant improvement for both the mothers and newborn outcomes receiving educational program implementation.

Keywords: educational program, preeclampsia, nurses' performance, pregnancy outcomes.

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IMP ACT OF ANE DUCATIONAL PROGRAMA BOUTPREECLAMPSIA FORMATERNITY NURSES ON THE IRPERFORMANCE AN OPREGNANCY OUTCOMES

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Conclusion & recommendations: Educational program for nurses working in the maternity units showed a great impact on their performance with mothers suffering from PIH. With the perspective of the impact of the educational program on maternal and fetal and newborn health conditions. Encourage nurses to attend continuing education in the form of workshops, conferences, training programs, and review update nursing care related to preeclampsia.

Keywords: educational program, preeclampsia, nurses' performance, pregnancy outcomes.

I. INTRODUCTION

omen's health is essential for the development of a healthy family, and consequently, a healthy community. During pregnancy, many complications may affect women's health. (Preeclampsia and eclampsia are the most common causes of morbidity affecting mothers in developing countries. They are contributing to the occurrence of high-risk pregnancies, which carries hazards to the health of women and their fetuses). Hypertensive disorders are the most common medical complication of pregnancy. (WHO, 1995; Martin et al., 2003). The American College of Obstetricians and Gynecologists (ACOG, 1999) define preeclampsia as either a systolic blood pressure of >140 mmHg or a diastolic blood Author: Department of Maternity and Newborn Health Nursing, College of Applied Medical Sciences, Prince Sattam Bin Abdulaziz University, Al Kharj, Saudi Arabia. e-mail: e.abdelhalim@psau.edu.sa

pressure >90mmhg observed in two occasions at least 6 hours apart. Ideally, the blood pressure should be compared with a baseline established in the first trimester. In the absence of baseline values, a blood pressure of 140/90 has been accepted as hypertension. *(Karnath, 2002).*

The hypertensive incidence of disease pregnancy associated varies with widely in epidemiological studies due to variations in definitions, and the differences in data collection. Pregnancyinduced hypertension continues to be important in the United States. in recent studies, these conditions were to be the second leading causes of maternal death. It is estimated hypertensive complications that approximately 10% of all pregnancies. The prevalence is increasing as many as 20 to 40% of pregnancies in women with chronic hypertension. (Berry, 2006; Martin et al., 2003). In Egypt pregnancy - induced hypertension is considered a major cause of maternal death, associated with 27% of direct obstetric death and 22% of all maternal deaths (National Maternal Mortality Study 2000, NMMS, 2001).

When Pre-eclampsia is diagnosed in its early stages, bed rest is usually advised for the mother and, her BP should be monitored closely. However, if the disease progresses, the doctor would be left without a choice but to induce labor or deliver by Caesarean, regardless of whether the baby has matured to full term or not. The blood pressure would then return to normal within 2-3 days (Williams, 2007; Sibia et al., 2007). Preeclampsia can affect the arteries carrying blood to the placenta. When this happens, the fetus receives less oxygen and nutrition, resulting in slow growth, low birth weight, pre-maturity or, stillbirth. Pre-eclampsia also increases the risk of the placenta separating from the inner wall of the uterus before delivery (abruption). This can cause uncontrollable bleeding and be lifethreatening for both mother and baby. Another complication is Eclampsia (Pre-eclampsia plus seizures) that happens when Pre-eclampsia is uncontrolled. This is associated with maternal mortality (Reeder et al., 1997).

a) Significance of the study

Wacker et al (1998) have emphasized on the fact that early prenatal care, identification of pregnant

women at risk for preeclampsia, as well as recognition and reporting of physical warning signs, are essential components in the optimization of maternal and prenatal outcome .in this regard, nurse's role is essential. Moreover, nurses can do much in the advocacy role. Measurements should be done to improve public education and to access antenatal care. Counseling, referral to community resources, mobilization of support system, and providing a component of care. The nurse's role as an educator is important in informing the women about her condition and responsibilities preeclampsia management, whether at home or hospital (Lowdermilk et al., 2000). Prevention of diseases is a key concept to nursing where barriers sometimes present in prenatal care, the role of the nurse is very important to assess the condition of the mother, identify deviation from normal and intervene accordingly, and provide care.

II. Aim of Study

The aim of this study is to evaluate the impact of preeclampsia an educational program on maternity nurses' performance and maternal and neonatal outcome.

III. MATERIAL AND METHODS

a) Research Design

This study was carried out using a quasiexperimental (pre & posttest) research design was used to evaluate the impact of an educational program about preeclampsia for maternity nurses on their performance and maternal and neonatal outcomes.

b) Study Setting

The study was carried out at Port-Fouad General hospital and Specialized Women and Obstetrics Hospital in Port-Said city. These are hospitals providing outpatient and inpatient obstetrical and gynecological services.

c) Study subjects

The subjects of the study include two groups as the following: group1 all nurses (30 nurses) in the inpatient (obstetric and gynecological department) at three hospitals located in Port Said city mentioned setting before. Group 2 all inpatient women diagnosed with preeclampsia (20 women) who attended the mentioned setting before during the period of the program conduction.

IV. Tools for Data Collection

The researcher designed an interview questionnaire form, an initial examination sheet, and an observation checklist for maternal and fetal outcomes. *Two tools of data collection developed and used by the researcher based on.*

V. Tool I: Structured Interviewing Questionnaire for the Nurses:

a) It is including two parts

Part 1: Socio-demographic data such as: Nurse's name, age, education, years of experience, attended in the training program

part 2: Observational Chick list

This tool designed mainly to collect data related to the nurse's performance regarding the nursing care for women with mild and severs preeclampsia and eclampsia during labor and post partum.

VI. Tool II Structured Interviewing Questionnaire for Women:

a) It is including two parts

Part 1:- Socio-demographic data such as: Mother's name, address, age, education, occupation and, husband "occupation".

Part 2:- Obstetrical history such as: Gravid, parity, birth interval, history of present pregnancy, and the present and previous obstetrical risk factors - Physical examination such as: Level of blood pressure, level of edema and protein urea, patient's weight, present complications which may happen such as bleeding or epigastric pain, types of delivery, and Apgar score in 1minutes and 5 minutes.

b) Validity and reliability

Tools were reviewed by a panel of seven experts in the field of Obstetrics and Gynecological Nursing to test its content validity; modifications were done accordingly based on their judgment. Reliability was done by Cronbach's Alpha Coefficient Test, which revealed that each item of the utilized tools consisted of relatively homogeneous items.

c) Ethical considerations

An official letter from the Faculty of Nursing, Port Said University, was directed to the responsible authorities to obtain their permission to conduct the study after explaining its purpose. The aim of the study was explained to every study subjects, and an oral agreement for participation in the study was gained. Those who agreed to participate were assured about confidentiality, privacy and their right to leave the study at any time.

d) A pilot study

A pilot study was carried out on 10% of the sample, to clarify the validity and reliability of the questionnaire. Then modification was done, and to test the research feasibility, clarity, and objectivity of the tools as well to estimate the time needed for data collection.

e) Field of the work

Following this pilot study, the process of data collection and give of the educational program consumed four months from May 2019 to August 2019. The data were collected according to the following phases:

Assessment phase: During this phase, the process of sampling was done. The data were collected from the maternity nurses and pregnant women with preeclampsia who gave their consent to participate using the data collection form and observational checklist. The collected data served as a pre-test for baseline comparison with posttest data. It also helped the researcher to identify the educational needs of the participants in order to design the program.

Design of the educational program: The educational program aimed at improving nurse's performance related to nursing care for women with preeclampsia and pregnancy outcome was designed by the researcher based on the scientific background, and in the light of the needs identified in the pre-test assessment. The guideline included information regarding the important nursing care given to the patient with preeclampsia during pregnancy, labor, and postpartum. It involved both theoretical and practical training.

Implementation phase: The program was given to all maternity nurses.

Evaluation phase: Evaluation of nurses' performance care was done during pregnancy, labor, and postpartum using the same tools. Additionally, pregnancy outcomes (women & fetus) were compared between the study and control groups.

Statistical analysis: Data entry and statistical analysis were performed using computer software: the statistical package for social sciences (SPSS), version 20. Suitable descriptive statistics were used, such as; frequency, percentage, median, range, mean and standard deviation. Continuous data were checked for normality by using the Shapiro Walk test. For all the tests used, statistical significance was considered at p-value < 0.05.

VII. Results

Table (1): shows the nurses' sociodemographic and job characteristics. As regard age, half of the studied subjects (50%) were in the age group ranging between 20 to less than 30 years, while those aged 50 or more constituted 6.7% of the subjects. Concerning their educational level, the majority of the nurses (86.7%) had a nursing diplomas and did not have a Certificate of specialization (93.3%). Regarding the experience in nursing, the mean years of experience in nursing of the nurses were around 10.8 ± 9.3 . *Table (2):* Shows the satisfaction of nursing care performance for pregnant women suffering from preeclampsia throughout the study phases. It shows a statistically significant improvement between the adequate performance of nursing care for pregnant women suffering from preeclampsia throughout the pre and post-program except read the mother record, insert indwelling catheter as prescribed, administer the prescribed medication and collect samples, and sent it to the lab. All nurses did not perform this care in different timings of the study.

Table (3): Shows the nursing care during labor and postpartum for pregnant women suffering from preeclampsia throughout the study phases. It shows a statistically significant improvement between the adequate performance of nursing care for pregnant women pre and post-program, except in the assessment and care of the newborn. All nurses did not perform this care in different timings of the study.

Table (4) Shows the Socio-demographic characteristics of the control and study groups. Regarding age, about the highest percent (60.0%) of the study subjects in the control group had their age from 30 years to more than 40 years. While more than two thirds (70%) of the subjects in the study group had age below 30 years. However, there was a statistically significantly difference between both groups (P< 0.037).

Regarding the level of education, about half of mothers in both groups had Diploma levels of education. And more than half of the study mothers were house wife; there were no statistically significant difference between both groups regarding the level of education, and job status.

The characteristics of the obstetric history of the control and study mother's *table* 5. The number of pregnancies in the two groups control and study, with about half of the mothers' primgravida.50% of the mothers nullipara related to number of delivery. Thus, there was no statistically significant difference between the two groups regarding the numbers of pregnancy and delivery.

As regards the duration of the current pregnancy, the mean score of subjects of the control group before applying the program 32.9 ± 3.6 , compared to 36.5 ± 1.3 of the study group after applying for the program. However, the mean score of the duration of the current pregnancy was statistically significant differences between the two groups.

Table 6 shows the results of the examination of the control and study groups of mothers. As regards, the blood pressure the mean score 154.1 ± 7.1 of systolic blood pressure (mmHg) of the mothers in the control group, compared with 148.3 ± 7.2 of the mothers in the study group. Was statistically significantly different between the two groups (P<0.015).

As regards the degrees of edema the half of mothers in the control group had +2 degree of edema, compared with 70.0% of the mothers in the study group. There was not statistically significantly different between the two groups. According to the abdominal examination, the mean score of the duration of pregnancy to the mothers in the control group 32.9 ± 3.6 , compared with 36.5±1.3 to the mothers in the study group. Was statistically significantly different between the two groups (P<0.001). Regarding the fetal heart beats 60.0% the heart beats of the fetus in the control group from 160 to more than 190 beats / min, while, more than half 55.0% the heart beats of the fetus in the study group from 130 to less than 160 beats / min, there was a statistically significant different between the two aroups (P<0.014). According to the current complications, the highest percent 75.0% of the mothers in the control group suffering from complication the half of them complain from hemorrhage. Compared with 30.0% of the mothers in the study aroup suffering from complications, there was a statistically significant different between the two groups (P<0.0001). According to post-partum complications the highest percent 70.0% of the mothers in the control group are suffering from

complications. More than two-third of them complain from vaginal hemorrhage. Compared with 25.0% of the mothers in the study group suffering from complications. There was a statistically significant different between the two groups (P<0.0001).

Table 7 shows the characteristics of the newborn babies of the control and study groups of mothers. statistically significantly babies are lives were observed among mothers in the study group (100.0%), compared to mothers in the control group (95.5%), as seen in the table. The higher percentages of newborns of mothers in the control group were suffering from respiratory distress (68.2%), compared to (27.3%) newborns of mothers in the study group. Meanwhile, higher percentages (68.2%) preterm baby of mothers in the control group, Compared to (13.6%) preterm baby of mothers in the study group.

As regards the Apgar score 45.5%, 72.7% at the first and fifth minute the score from 7 to 10, respectively, for the newborns of mothers in the study group, compared to 18.2%, 36.4% at the first and fifth minute the score from 7 to 10, respectively, for the newborns of mothers in the control group, there was a statistically significant different between the two groups (P<0.0001).

Table (1): Distribution of the nurses according to their Socio-demographic and job characteristics data (n=30)

Socio-demographic characteristics	No.	%	
Age (years)			
Less than 20	3	10.0	
20-	15	50.0	
30-	5	16.7	
40-	5	16.7	
More than 50	2	6.7	
Range	18-55		
Mean±SD	30.6±10.3		
Educational level			
Nursing diploma	26	86.7	
Technical of nursing	2	6.7	
Faculty of nursing	2	6.7	
Certificate of specialization			
Yes	28	93.3	
No	2	6.7	
Duration of experience			
Less than 10	17	56.7	
10-	5	16.7	
20-	6	20.0	
More than 30	2	6.7	
Range	1-	31	
Mean±SD	10.8	±9.3	

Table (2): Nurses' performance for pregnant women suffering from preeclampsia throughout pre and post-program

		Tin	ne			
Nursing care performance of pre-eclampsia	I (n	Pre =30)	P (n=	ost =30)	Chi-Square test (X ²)	P- value
Greeting the mother.	23	76.7	26	86.7	Fisher	FEP=1.0
Read the mother record.	30	100.0	30	100.0	-NA-	-NA-
Place the mother in the on bed in her side.	15	50.0	15	50.0	-NA-	-NA-
Assist doctor during local physical examination	22	73.3	30	100.0	7.94	0.005*
Monitor Vital signs as prescribed	27	90.0	30	100.0	Fisher	^{FE} P=0.237
Assess degree of edema.	0	0.0	30	100.0	60.0	(0.0001)*
Start IV infusion as prescribed	30	100.0	30	100.0	-NA-	-NA-
Monitor IV fluid closely.	2	6.7	21	70.0	25.45	(0.0001)*
Perform urine analysis for protein as prescribed	22	73.3	30	100.0	7.94	0.005*
Insert indwelling catheter as prescribed	30	100.0	30	100.0	-NA-	-NA-
Measure and Record fluid intake and output.	13	43.3	30	100.0	23.72	(0.0001)*
Measure woman weight daily.	0	0.0	30	100.0	60.0	(0.0001)*
Administer the prescribed medication	30	100.0	30	100.0	-NA-	-NA-
Report woman's response to therapy.	1	3.3	23	76.7	33.61	(0.0001)*
Assess deep tendon reflexes every shift.	0	0.0	27	90.0	49.09	(0.0001)*
Not left the woman to go toilet alone.	0	0.0	13	43.3	16.6	(0.0001)*
Collect samples and sent to lab	30	100.0	30	100.0	-NA-	-NA-
Observe signs of immediate seizure	3	10.0	24	80.0	29.7	(0.0001)*
Monitor any dangerous signs	7	23.3	30	100.0	37.3	(0.0001)*
Monitoring uterine and fetal status as prescribed	28	93.3	30	100.0	Fisher	FEP=0.492*
Explain any procedures to the woman	13	43.3	21	70.0	4.34	(0.037)*
Assess signs of labor.	18	60.0	30	100.0	15.0	(0.0001)*
Perform a nursing care plan using nursing process.	0	0.0	8	26.7	Fisher	FEP=0.005*

Table (3): N	Nursing care during labor and the postpartum period for pregnant women suffering from pr	reeclampsia
	throughout pre and post-program	

		Tin	Chi			
Nursing Care Performance during Labor and Post	Pre	(n=30)	Post (n	=30)	Square	P- value
Partum	No	%	No	%	Test	i vulue
Monitor the blood pressure	22	73.3	30	100.0	Fisher	FEP=0.005*
Check for edema	0	0.0	29	96.7	56.13	(0.0001)*
Detect protein urea levels	1	3.3	21	70.0	28.71	(0.0001)*
Prepare equipment and intravenous lines	28	93.3	30	100.0	Fisher	FEP=0.492*
Label bottles	19	63.3	21	70.0	0.3	(0.584)*
During labor						
Note signs of progress labor	22	73.3	28	93.3	4.32	(0.038)*
Put wedge under the right buttock in lithotomy position or C.S.	6	20.0	23	76.7	19.29	(0.0001)*
Administer O2 during labor to the patient	19	63.3	26	86.7	3.35	(0.007)*
Assessment and care of Newborn.	0	0.0	0	0.0	-NA-	-NA-
Postpartum						
Observe the amount of vaginal bleeding	23	76.7	28	93.3	Fisher	FEP=0.146
Palpate the uterus and massaged when needed	13	43.3	22	73.3	5.55	(0.018)*
Check B.P. and pulse every 4 hours for 48 hours	22	73.3	28	93.3	3.32	(0.028)*
Instruct the woman to report headache or visual disturbances	28	93.3	30	100.0	Fisher	FEP=0.492*
Record intake and output for 48 hours	29	96.7	30	100.0	Fisher	FEP=1.0

X2: Chi-Square test FEP: Fisher's Exact test *significant at P≤0.05 -NA-: Not applicable

Table (4): Socio-demographic characteristics of the control and study groups of mothers.

Personal characteristics	Control Group (n=20)		Study ((n=	Group 20)	Significance
	No.	%	No.	%	
Age (years)					
Less than 20	2	10.0	1	5.0	
20-	6	30.0	14	70.0	
30-<40	12	60.0	5	25.0	
Range	19-	-38	17-	-38	t=2.167
Mean±SD	30.6±6.9		26.2	±5.9	P=0.037*
Educational level					
Read and write	1	5.0	1	5.0	
Primary	4	20.0	2	10.0	MCD_0 794
Preparatory	2	10.0	3	15.0	P=0.784

Diploma University	10 3	50.0 15.0	10 4	50.0 20.0	
Employment					
House wife	12	60.0	11	55.0	X ² =0.175
Employed	8	40.0	9	45.0	P=0.676

All are live in urban areas. t: t-test Z: Mann Whitney test MCP: Monte Carlo test X2: Chi-Square test *significant at P<0.05

Table (5): Obstetric histo	ry of the	control a	nd study	groups c	of mothers					
Obstetric History	Control Group (n=20)		Control Group (n=20)		Study Group (n=20)		Control Study Sup(n=20) Group (n=20)		Test	P- value
	No	%	No	%						
The number of	10	50.0	10	50.0						
pregnancies:	6	30.0	10	50.0						
1 2-3	4	20.0	0	0.0						
4	1	-1	1	3						
Range Mean±SD	2.2	±1.3	1.6±0.7		Z=1.213	0.225				
The number of deliveries:										
Prime	10	50.0	10	50.0						
1-2	6	30.0	10	50.0						
3	4	20.0	0	0.0						

t: t-test Z: Mann Whitney test *significant at $P \le 0.05$

Mean±SD

Mean±SD

Duration of current

pregnancy (weeks):

Table (6): Results of examination of the control and study groups of mothers

 1.1 ± 1.2

 32.9 ± 3.6

 0.6 ± 0.7

36.5±1.3

Z=1.169

t=3.94

0.242

0.001*

Results of Examination	Control Group(n=20)		Study Group (n=20)		Significance
Systolic blood pressure (mmHg)					
Range	140	-160	140	-150	t=2.561
Mean±SD	154.	1 ± 7.1	148.3	3±7.2	P=0.015*
Diastolic blood pressure (mmHg) Range	90-	110	90-110		t=1.665
Mean±SD	99.2±5.5		99.2±5.5		P=0.104
General condition	No.	%	No.	%	
Degrees of edema					
+1	0	0.0	2	10.0	
+2	10	50.0	14	70.0	^{мс} Р=0.064
+3	7	35.0	4	20.0	
+4	3	15.0	0	0.0	
Abdominal examination		•		•	
Duration of pregnancy (gestational weeks)					

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Range	24	-37	33-38		t=3.94
Mean±SD	32.9	±3.6	36.5	±1.3	P=0.001*
Fetal heart beats (beats/min)	2	15.0	4		
100-	5	15.0	4	20.0	
130-	5	25.0	11 ~	55.0	мср=0.014*
160-<190	12	60.0	5	25.0	
Current complications	5	25.0	14	60.0	
No					
Yes [#]	15	75.0	6	30.0	X ² =15.14
Intra uterine fetal growth retardation	8	40.0	1	5.0	P<0.0001*
Eclampsia	2	10.0	0	0.0	
Hemorrhage	10	50.0	5	25.0	
No	5	25.0	14	60.0	
Postpartum complications	6	30.0	15	75.0	
No	14	70.0	5	25.0	
Yes [#]	14	70.0	5		$X^2 = 14.4$
Vaginal hemorrhage	9	64.4	3	60.0	D 0 00014
Convulsions	1	7.1	0	0.0	P=0.0001*
Bleeding disorder	7	50.0	2	40.0	

*t: t-test Z: Mann Whitney test MCP: Monte Carlo test *significant at* $P \le 0.05$

Table (7): Characteristics of a newborn babies of the control and study groups of mothers

	Cont	rol	Study		
Characteristics of A	Grou	Group Group Signif		Significance	
newborn Babies	(n =2	20)	(n=2	20)	Significance
	No.	%	No.	%	
Fate of pregnancy					
Living	21	95.5	22	100.0	^Y P=0.1*
Stillbirth	1	4.5	0	0.0	
Respiratory distress					
No	8	36.4	16	72.7	X ² =13.065
Yes	14	63.6	6	27.3	P<0.0001*
Preterm labor					
Pre-term	15	68.2	3	13.6	$X^2 = 15.13$
Full-term	7	31.8	19	86.4	P<0.0001*
Apgar score at 1 st minute					
0-3	7	31.8	3	13.6	
4-6	11	50.0	9	40.9	t=4.536
7-10	4	18.2	10	45.5	p<0.0001*
Range	2-7		3-8		
Mean±SD	4.1±1.2		5.9±1.4		
Apgar score at 5 th minute					
0-3	1	4.5	0	0.0	
4-6	13	59.1	6	27.3	t=4.604
7=10	8	36.4	16	72.7	p<0.0001*

Range	0-9		5-10		
Mean±SD	5.6±1.9		7.9)±1.4	
Need resuscitation	8	36.4	3	13.6	t=1.742 P=0.009
Need incubator	14	63.6	6	27.3	X ² =13.065 P<0.0001*

^ Number is more than that of mothers as two babies from each group had twins

X2: Chi-Square test t: t-test Z: Mann Whitney test YP: Yates corrected Chi-Square test *significant at $P \le 0.05$

VIII. Discussion

Nurses have an important and effective role in the prevention of complications of preeclampsia, assistance in early detection, and appropriate management of these disorders to minimize the adverse effects in both mother & infant through attending the antenatal clinic periodically durina pregnancy. Furthermore, collaborative efforts from all members of the health team, as well as appropriate self-care practices of women with PIH is required. The nurse should be knowledgeable and highly skillful in providing nursing care according to women's needs and problems to save their lives (Gilbert & Hartman, 1995). Therefore, this study was undertaken to provide nurses, as healthcare providers, with the skills necessary to provide care to women with preeclampsia.

Regarding nurses' performance about nursing care for preeclampsia pregnant women. The present study revealed that the majority of nurses had the unsatisfactory and inadequate practice of the care for pre-eclampsia before program implementation; while after the program most of them provide satisfactory nursing care for women with preeclampsia. This is probably because that most nurses had basic deficit knowledge about nursing care for women with preeclampsia. This may lead to an inability of nurses to provide satisfactory nursing care. These results are in the same line with *Tawfek (2002)*, who reported that most nurses did not perform nursing care for women with hypertension disorder with pregnancy (HDP) before the training program.

Novak and Broom, 1999, mentioned that nursing care of mild preeclampsia in the hospital includes the following: Check and record vital signs (pulse, temperature and respiration), history is taken, documents risk factors, and any symptoms outlined before blood pressure, and women's weight gain should be obtained, looks for evidence of generalized edema or pitting edema. Ask women about warning signs and symptoms. Perform urine analysis for protein as prescribed (using dipstick test). Assist doctor during a physical examination and monitoring of fetal heart rate (FHR) and refer hypertensive women to perform their laboratory studied and other investigation as ordered.

According to the study findings, the highest percent (60.0%) of the study subjects in the control group had their age from 30 years to more than 40 years. At the same time about (70.0%) of the subjects in the study group had their age below 30 years, with mean ages of 30.6 and 26.2, respectively. This finding is in agreement with those of the previous studies *Gida* (2002) reported that more than two-thirds of the preeclampsia mothers in port said had their age ranging between 25 years and more. Moreover, *Mabie and Sibai* (1992) found that the highest incidence of preeclampsia was among pregnant females of 20 years or more. Alternatively, *Gibson and Carson (2002)* have reported that preeclampsia is more common at extremes of maternal age.

The present study findings showed that half of the mothers in both groups had Diploma levels of education. Moreover, more than half of the study mothers were house wife. These characteristics are similar to those documented for most preeclamptic women in many studies. *Rooney (1994)* reported that a uniform incidence of toxemia had been found throughout all social classes. However, *Whitfield (1995)*; *Leifer (1999)* reported that patients with low socioeconomic classes are more likely to develop preeclampsia. The high incidence of preeclampsia among low family income group may be related to bad nutrition, ignorance, and lack of medical care and seeking of regular prenatal care among this group.

In the present study, as regards the risk factors of preeclampsia experienced by women was found that, about more than one third of women in both groups had previous history of preeclampsia. The characteristics of obstetric history of the study subjects of both groups were similar in some aspects to those of preeclampsia women discovered in many others studies. These findings are in line of *Abbas et al. (1999)* who stated that women with a history of preeclampsia are at increase risk of preeclampsia in later pregnancies.

Furthermore, women whose mothers suffered from preeclampsia are three times more likely to develop symptoms associated with preeclampsia than other women (*Murray et al., 2002*). In the present study, about one third of the studied women in both groups had a family history of preeclampsia.

Gravidity has been considered, in many studies, as risk factor in pregnancy- induced hypertension. In the present study, about half of the studied women in both groups were primgravida and nullipara. *Wallenburg* (1990) reported that nulliparous women are twice as likely to develop preeclampsia as multiparas, and this risk is particularly high at extremes of age. Multiparous women who have suffered from preeclampsia in

previous pregnancies are at increased risk, compared to multiparas who have not.

According to Churchill and Beevers (1999) who stated that maternal age an important factors and clearly for preeclampsia. Preeclampsia is very common in very young women who had poor antenatal care, with an important contribution from social class. Also, it is common in the first pregnancy (in primipara it was 13.5% compared with 7.1% in multipara) and women over the age of 30 years because of associated multiparty and differences in social class. This is supported by the finding of the present study. There are several factors as age, parity, education and socioeconomic factors. It was found that, women with lower socio-economic factors are reported to have a higher incidence of PIH, also, the primigravida and nullipara women, the incidence is increased.

One of the objectives of this study was to test the hypothesis that women with pregnancy- induced hypertension who receive nursing care after applying nursing program will have better maternal and fetal outcomes during pregnancy and after delivery, compared to women with the same diagnosis who receive nursing care before applying the nursing programs. Accordingly, both mothers and their fetuses were assessed during pregnancy and the postnatal period.

Regarding the results of the examination of the mother's in study and control groups. A statistically significant improvement in blood pressure monitoring was found among mother's study group compared to those in the control group (P<0.015). For the mothers in the post-program group, the main systolic and diastolic blood pressure are decreased. in this respect, Kyngas and Lahdenpera (1999) discovered a statistically significant connection between compliance with medication and the diastolic blood pressure reading. Those who had good compliance with medication had lower diastolic blood pressure than patients with poor compliance.

On the same line and in agreement with the present study finding. Dickason and Silverman (1995) have reported that preeclampsia mothers who were treated at the hospital, and monitored by frequent medical and nursing care, showed more improvement in the level of blood pressure and fetal outcome. Similar results were reported by El-Said (1993). The author has attributed these results to mother's compliance with the health instructions which given by the nurses throughout the nursing intervention.

The presence of edema with excessive weight gain is a problem in preeclampsia. The present study results showed a slight decrease in the proportion of women in the study group suffering from edema (20.0%) had +3 degree of edema compared with more than one third (35.0%) of mothers in the control group. A similar finding was reported by El-Said (1993). The degree of

edema did not show more improvement in the nursing intervention group mothers, as no differences were noted between the edema assessments.

Depending edema is common in normal pregnancy, but generalized edema is a sign of preeclampsia. Pregnant women could be taught to recognize generalized edema as a sign needing rapid referral to a center where blood pressure and proteinuria can be measured, and treatment arranged (Gibson and Carson, 2002). This might explain the previous results. However, since excessive weight gain with excessive edema is a major problem for patients with severe preeclampsia, more attention should be given to the daily measurements of patient's weight, as well as instructing her to care for edema.

Urinalysis to detect proteinuria is also recommended in women with pregnancy induced hypertension, as this is an important prognostic factor. A very small percentage or women who develop preeclampsia may show proteinuria before the rise in blood pressure (Pernoll, 1995; Grunrwald, 1997). In the present study, improvement of the main score 2.2±0.5 of proteinuria was observed for the mothers in the study group, compared with 3.0 ± 0.7 to the mothers in the control group. There was a statistically significant difference between the two groups (P<0.0001). This result is in agreement with El-Said (1993). Who found a decrease in proteinuria among women in the nursing intervention group, whereas proteinuria had increased markedly among women in the control group.

Regarding the current complications, the highest percent 75.0% of the mothers in the control group suffering from complications, half of them complains from hemorrhage. Compared with 30.0% of the mothers in the study group are suffering from complication. There was a statistically significant difference between the two groups (P<0.0001). A similar finding was reported by El-Said (1993). Who found that the majority of the study sample in the control group suffering from bleeding during pregnancy. However, 40% of the mothers in the intervention group suffering from bleeding during pregnancy.

Concerning the type labor and postpartum examinations of the mothers in study and control groups. According the type of delivery, the majority of the study sample 95.0%, 90.0% of the mothers in the pre and post program, respectively, had Cesarean section delivery. However, this difference was not statistically significant between the two groups. El-Said (1993) has reported similar results as regards the mode of delivery slightly more cesarean section deliveries were found in the intervention group, although the difference was not statistically significant.

Natal care is very important to reduce the complications of preeclampsia and improve the maternal and newborn outcome. Simpson and Creehan (2001) reported that it is important to be alert for signs

and symptoms of complications of preeclampsia such as postpartum hemorrhage and HELLP syndrome. The finding of the present study was noticed that the highest percent 70.0% of the mothers in the control group are suffering from complications after labor; more than twothird of them complians from vaginal hemorrhage. Compared with 25.0% of the mothers in the study group suffering from complication. There was a statistically significantly difference between the two groups (P<0.0001). This is possibly due to the mothers received good nursing care before, during and after labor.

In the present study, a statistically significant different between women in the two study groups regarding their fetal outcome. No case of stillbirth infants, were reported among women in the study group, while; only one case of stillbirth infant was reported among women in the control group. Moreover, 6 cases of respiratory distress among women in the study group. Compared to 14 cases in the control group. As regards premature infants 3 cases was reported among women in the study group, compared to 15 cases in the control group. However, as regards infant's growth at birth, all growth measurements for infants of pregnancy induced hypertensive women in the study group were statistically significantly better than those of infants of mothers in the control group (P<0.0001).

In agreement with the preceding findings of the present study, *Wong et al. (1998)* have reported that women with hypertensive diseases who receive inadequate care experience particularly greater risk of subsequent prematurity and low birth weight infant. This may be related to the progress of maternal condition that reflects directly on fetal health. Moreover, in agreement with the present study findings,

Abd Rabo (1992) has reported rates of neonatal losses of 20.0% and 2.0% in the control and intervention groups, respectively. There were statistically significant differences between the two study groups.

Many others, Lowdermilk& Perry, 2006 And Chen and Chang, 1995, mentioned that nursing care of severing preeclampsia represents emergency obstetric care. Immediate and continuous care by nurses aimed to prevent maternal and fetal mortality. The nurse should be place the patient in absolute bed rest on her side. Check and remove denture, record and report blood pressure frequently (at least every 4 hours) or with a continuous monitoring device to detect any increase, Obtain blood studies as ordered (i.e. complete blood count, platelet count, liver function, blood urea nitrogen, and creatine and fibrin degradation products) to assess renal and liver function and the development of DIC, assess and recorded the degree of edema, perform urine analysis for protein as prescribed, collect24 hrs, urine as ordered, measure and recorded woman's weight. She should assess for signs of labor, assess deep tendon reflexes every shift, and Observes dangerous signs and symptoms.

IX. Conclusion

a) Based on the results of the present study, it can be concluded that

Educational program for nurses working in the maternity units showed a great impact on their performance with mothers suffering from preeclampsia. With the perspective of the impact of the educational program on maternal and the fetal and newborn health conditions, the study revealed a statistically significant improvement to the mother's receiving nursing care after nursing educational program implementation. It was particularly obvious in the lower of blood pressure, proteinuria, and prenatal and postnatal complications. Similarly, fetal outcome was statistically significant improvement in the mothers group receiving nursing care after nursing educational program implementation as regards newborn measurements, and prenatal and postnatal complications.

X. Recommendations

Encourage nurses to attend continuing education in the form of workshops, conferences, training programs and review update nursing care related to preeclampsia. Standardized protocols for the treatment of emergency obstetric, includina preeclampsia, should be developed for the legal protection of nurses during their clinical practices. Frequent and scheduled In-services training should be applied at the hospital. Establish a library with recent scientific books and periodicals in the Arabic language. Future research regarding study the psychological aspects of women with preeclampsia. And studying factors affecting women with preeclampsia self-care practices.

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Cytotoxic Effect of *Rhopalurus junceus* Scorpion Venoms on the HeLa Cell Line

By Arianna Yglesias-Rivera, Arlett Rubio-Suárez, José Raúl Torres-Viltres, Rayner Ochoa-Cardentey, Hermis Rodríguez-Sánchez, Georgenis García-Oliva, Yandy Ybalmea-Gómez & Maritza Pupo-Antúnez

Abstract- Introduction: Venom composition in both sexes of Rhopalurus junceus scorpion has the same major components but it is different in many compounds. However, it is unknown whether the sex of this scorpion influences in its biological activity.

Objective: To compare the cytotoxic effect of this scorpion from both sexes on the HeLa tumor cells.

Materials and Methods: Protein content and gel image were analyzed by SDS-PAGE and Image J 1.46 software, respectively. HeLa and Vero cells were treated with each sex and a mixture of both sexes of this scorpion venom. Percentage of cell viability and the morphological changes were determined by MTT assay and phase contrast microscopy, respectively.

Keywords: Rhopalurus junceus scorpion venom, female, male, mixture of two sexes, heLa.

GJMR-F Classification: NLMC Code: QV 35



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Abstract- Introduction: Venom composition in both sexes of *Rhopalurus junceus* scorpion has the same major components but it is different in many compounds. However, it is unknown whether the sex of this scorpion influences in its biological activity.

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Results: Electrophoretic analysis demonstrated similarities and differences among experimental groups. Treated groups showed significant reduction of HeLa cell viability and morphological changes respect to untreated cells, but this effect is maintained regardless of the sex of this scorpion.

Conclusion: Despite of differences in the electrophoretic profile among experimental groups, the cytotoxic effect does not change in the HeLa tumor line.

Keywords: Rhopalurus junceus scorpion venom, female, male, mixture of two sexes, heLa.

I. INTRODUCTION

ancer is among the leading causes of death worldwide and has a major impact in both developed and underdeveloped countries (Siegel et al., 2020). Specifically, cervical cancer is one of the main public health problem affecting middle-aged women, particularly in developing countries (Arbyn et al., 2020). Conventional antitumor therapies used in clinical practice are surgery, radiotherapy and chemotherapy (Somayeh et al., 2017). These treatments are effective only to some extent, as they are not applicable in all cases and the undesirable side effects often make them impractical (Topcul and Cetin, 2014). For this reason, the antitumor potentialities of natural products such as scorpion venoms have been evaluated (Moradi et al., 2018; Desales-Salazar et al., 2020).

The scorpion venom is a highly complex and heterogeneous mixture of compounds, mainly proteins and peptides (Ahmadi et al., 2020). Around 2000 scorpion species have been described and only 30 species of the Buthidae family are considered dangerous to humans (Desales-Salazar et al., 2020). In a study carried out with two scorpions from Buthidae family: Androctonus finitimus and Hottentota tumulus, it was shown that the quantity and quality of extracted venom were associated with temperature, diet and the extraction method (Tobassum et al., 2018). Besides, venom composition can be influenced by different factors like sex, geographical location, age, time intervals of extraction and others (Pucca et al., 2014). For example, males and females of Tityus nororientalis scorpions produce venoms with different composition and activity (De Sousa et al., 2010).

Rhopalurus junceus (R. junceus) belongs to Buthidae family and is an endemic scorpion from Cuba. Preclinical studies have shown that R. junceus scorpion venom decreases the viability of tumor cells of epithelial origin and has no cytotoxic effect on normal cells (Díaz-García et al., 2013). In a proteomic comparative analysis of male and female R. junceus scorpion venom, from their 200 components just 63 were common and the most abundant component appeared in both sexes (Rodríguez-Ravelo et al., 2015). Previous studies by our group, using a mixture of venom of female and male scorpions in the same proportion and similar laboratory conditions have demonstrated their cytotoxic and apoptotic effect against cancer cells (Díaz-García et al., 2013; Díaz-García et al., 2015; Díaz-García et al., 2017; Yglesias-Rivera et al., 2019). Considering the described scenario, the objective of the present study was determine if there are differences among R. junceus scorpion venoms from female and males individually and mixture.

II. Methods

a) Scorpion Venom source

Female and male adults of *Rhopalurus junceus* scorpions, collected in Isla de la Juventud (Cuba), were kept in captivity for at least one month before venom extraction by electrical stimulation. Scorpions were maintained under Bioterium conditions in individual

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plastic containers at 23 \pm 1°C temperature, 60 \pm 10 % relative humidity and 12:12 h light-dark cycle, in the laboratories belonging to the Entrepreneurial Group of Biopharmaceuticals and Chemicals Productions (LABIOFAM). Bioterium conditions about management of scorpion colonies and collection of venom have been approved by the Ministry of Science, Technology and Environment of Cuba (CITMA 20/2016). Three groups of scorpions containing 50 female (G1), 50 male (G2) or a mixture of 25 females with 25 males (G3) were used. Venom was dissolved in distilled water and centrifuged at 15000xg for 15min. The supernatant was filtered by using a 0.2µm syringe filter and stored at -20°C until used. The protein concentration was calculated by Lowry Modified Method (Herrera et al., 1999).

b) SDS-PAGE and determination of molecular weight (MW)

Electrophoretic analysis of each pooled venom was carried out according to the previous method (Díaz-García *et al.*, 2015) with 4% stacking gel and 16% separating gel under non-reduced and reduced (2-mercaptoethanol, 95°C, 10 min) conditions using an electrophoresis chamber (Biorad). All samples were dissolved in a sample buffer (50mM Tris–HCl, pH 6.8, 0.1M DTT, 10% glycerol, 2% SDS, and 0.1% bromophenol blue). In each well, 50 μ g of venom was applied and a protein MW marker was used. The run conditions were 120 V to free current for two hours. The gels were stained with Coomassie Brilliant Blue G-250 and were subsequently rinsed with Methanol: Acetic acid: Water (45:10:45). The gels were photographed and analyzed using ImageJ 1.46 software.

c) Cell line and culture

HeLa (cervix adenocarcinoma ATCC CCL-2TM) cell line was maintained in minimum essential medium (MEM). Vero (normal African green monkey kidney ATCC CRL-1586TM) cell line was maintained in Dulbecco's modified Eagle's medium. The mediums of both cell lines were supplemented with 2 mM of glutamine and non-essential amino acids, 10% of fetal bovine serum (SFB) and penicillin-streptomycin 100 Ul/mL -100 μ g/mL. The cells were grown in a humidified atmosphere, 5% CO₂ at 37°C.

d) In vitro cell viability assay (MTT assay)

The effect of scorpion venom on cell viability was determined by the MTT Assay (Mosmann, 1983). HeLa cells $(1x10^4$ /well) and Vero cells $(1x10^4$ /well) were plated in 50µl of medium/well in 96-well culture plates (Costar Corning, Rochester, NY) and incubated overnight in a humidified atmosphere of 5% (v/v) CO₂ at 37°C. After incubation, 50µl of venom was dissolved in medium at final concentration of 0.0625, 0.125, 0.25, 0.5 and 1mg/mL and was added in five well for every concentration. Cells without scorpion venom were used

as untreated control. After 72h of incubation, 10µl of 5mg/mL of sterile MTT was added per well and incubated for another 3h. The supernatant was carefully removed, 150µl DMSO was added per well and incubated for 15min at 37°C. The absorbance was determined in a microplate reader (ELISA MRX Revelation Dynex Technologies 560nm with 630nm as reference). Absorbance from untreated cells was considered as 100% of growth and used for viability calculation. The effect of scorpion venom on the viability for human cell lines panel was expressed as the percentage of viability, using the formula: %viability= A_{560-630nm} of treated cells/ A_{560-630nm} of control cells x 100%. The IC₅₀ values (venom concentration that causes 50% reduction of the cell) from cancer cells were determined. The experiments were performed three times by triplicate.

e) Phase-contrast microscopy

After treatments, cells were washed with PBS and morphological changes in culture were then observed under microscope IX-71 (Olympus Corporation, Tokyo, Japan). Images were captured using the camera DP-72 (Olympus Corporation, Tokyo, Japan) and 10X objectives.

f) Statistical analysis

Kruskal-Wallis non-parametric test and Dunn's multiple comparison tests was used to compare different assays. Two-way Anova and Bonferroni posttest were performed to analyze differences in MW, protein band intensity and cell viability. The IC50 value was determined by interpolation of tendency line from linear regression curve. GraphPad Prism version 5.01 for Windows, (GraphPad Software, San Diego California, USA) for p<0.05 was used for all analysis.

III. Results

There was no significant difference among total protein concentration of female (G1), male (G2) and the mixture of both sexes (G3) of *R. junceus* scorpion venom in our experimental conditions (Figure 1). The values of Mean \pm SD for G1, G2 and G3 were 8.3 \pm 1.1 mg/mL, 8.5 \pm 2.9 mg/mL and 8.2 \pm 1.6 mg/mL, respectively. However, the electrophoretic analysis of protein content from G1, G2 and G3 under non-reduced and reduced conditions demonstrated similarities and differences among experimental groups (Figure 2).



Figure 1: Comparison of protein concentration in male, female and the mixture of sexes in *R. junceus* scorpion venom. The graphic represents the mean \pm SD of total protein concentration values of three independent experiments with female (G1), male (G2) and female + male (G3) *R. junceus* scorpion venom. Data were analyzed using Kruskal-Wallis followed by Dunn test.



Figure 2: SDS-PAGE analysis of male, female and the mixture of both sexes *R. junceus* scorpion venom. *A*) Non-reduced SDS-PAGE. B) Reduced SDS-PAGE. G1: female, G2: male, G3: female + male *R. junceus* scorpion venom. Separating gel 16%, stacking gel 4%. Molecular weight protein marker from 10 kDa-175 kDa was used

Six bands were observed in non-reduced (Figure 2A) and reduced (Figure 2B) conditions of SDS-PAGE, in the venom of female and male scorpions. While in the case of the venom obtained from the mixture of scorpions of both sexes, six bands were observed under non-reduced conditions and seven under reduced conditions. The comparison of molecular weight (MW) and protein band intensity among the groups of *R. junceus* scorpion are presented in Table 1. Non-reduced electrophoresis conditions showed five similarities in the MW of (55, 45, 39, 28 and 19 kDa) from G1 and G2 scorpion groups. However, in these conditions was observed a difference between them. A band of 11kDa was displayed only in G2 and 12kDa band only in G1 and G3. The molecular weights observed in non-reduced conditions of the mixture of both sexes were: 52, 45, 39, 28, 19 and 12 kDa. Electrophoresis under reduced conditions displayed two resemblances (at 44 and 11 kDa) and four differences between the protein MW of G1 and G2 groups. An 11kDa coincident band was observed in all groups. There were no statistically significant differences between the molecular weight of the bands in both electrophoretic conditions for G1 and G2. The appearance of 47kDa band in G3 group was the only statistically significant difference in MW respect to G1 and G2 groups.

Regarding to intensity values, statistically significant differences were found between both G1 and G2 groups for the bands at 12 and 11 kDa (p < 0.001); for G3 group in the bands at 52 (p < 0.05) and 12 kDa (p < 0.001) concerning to G1 and G2 groups. All these results were based in electrophoretic analysis under non-reduced conditions. In reduced conditions, the

intensity values for the 11 kDa band obtained for G3 demonstrated a statistically significant difference respect to G1 (p <0.05) and G2 groups (p <0.001).

Table 1: Comparison of MW and intensity of protein band in female (G1), male (G2) and female + male (G3) of *R. junceus* scorpion venom

	G1		G2		G3	
SDS- PAGE	MW (kDa	Band Intensity	MW (kDa	Band Intensity	MW (kDa)	Band Intensity
non- reduced conditions	55	585	55	1105	52	1762 ^{ab}
	45	1813	45	2060	45	1642
	39	1090	39	1201	39	991
	28	759	28	1178	28	695
	19	2055	19	2714	19	2883
	12	21540 ^{b*c*}	11	26950 ^{a~c~}	12	24290ª"b
	66	656	65	729	64	1011
	50	922	49	1295	52	816
	44	412	44	363	47 ^{a*b*}	448
	23	1374	25	1465	42	674
1	17	2858	18	923	24	1266
reduced	11	10926 ^{b"c'}	11	15010 ^{a*c**}	19	957
conditions					11	7479ªb"

Legend: Data were analyzed using two-way ANOVA followed by Bonferroni test: a': p < 0.05 (G1), a''': p < 0.001 (G1); b': p < 0.05 (G2), b''': p < 0.001 (G2) and c': p < 0.05 (G3), c''': p < 0.001 (G3).

Viability was significantly reduced on the HeLa tumor cell line treated respect to untreated control after 72h for 0.25 mg/mL (p<0.05), 0.5 mg/mL (p<0.001) and 1 mg/mL (p<0.001) for G2 group. The same results were observed for G1 and G3 at 0.5 mg/mL (p<0.01) and 1 mg/mL (p<0.001) (Figure 3A). The effect on the Vero cell line resulted in no significant difference in cell

viability between treated and untreated cells for all groups and concentrations studied (Figure 3B). However, no statistically significant differences were observed for the percentages of cells viability among all groups and concentrations of *R. junceus* scorpion venom evaluated in HeLa and Vero cell lines.



Figure 3: Cytotoxicity of G1, G2 and G3 of *R. junceus* scorpion venom on the HeLa and the Vero cell lines. The cells HeLa (A) and Vero (B) were incubated for 72h with scorpion venom at concentrations of 0.063-1mg/ml. Cell viability percentages were compared respect to untreated control group by Kruskal-Wallis non-parametric test and Dunn's multiple comparison test. Significant differences *p<0.05, **p<0.01,***p<0.001. Comparison of cell viability among G1, G2 and G3 groups for each concentration were analyzed by two-way Anova and Bonferroni post-test.

The IC₅₀ values found for HeLa cells were not significantly different among G1 (1.13mg/mL), G2 (1.034 mg/mL) and G3 (1.175 mg/mL) groups. In Vero cell line, no cytotoxic effect was observed in all concentration

tested and the theoretical IC_{50} values were higher than 1 mg/mL: 3.1, 3.5 and 2.6 mg/mL for G1, G2 and G3, respectively (Table 2).

Table 2: The IC₅₀ values on the HeLa and the Vero cell lines exposed to G1, G2 and G3 of *R. junceus* scorpion venom. Values represent the mean \pm SD derived from three independent experiments. Data showed as >1 means No effect.

	IC _{se} (mg/mL)				
Samples of <i>R.junceus</i> scorpion venom	HeLa	Vero			
G1	1.13 ± 0.004	> 1			
G2	1.034 ± 0.262	>1			
G3	1.175 ± 0.128	>1			

The morphological changes induced at 1 mg/mL of G1, G2 and G3 of *R. junceus* scorpion venom are shown in the Figure 4. All of them induced a loss of

membrane integrity on HeLa cells; meanwhile Vero cells were not affected by scorpion venom from all studied group.



Figure 4: Morphology of HeLa and Vero treated with G1, G2 and G3 of *R. junceus* scorpion venom. A representative image of the effect of G1, G2 and G3 of *R. junceus* scorpion venom at 1 mg/mL on the treated monolayer for 72 hours. Cell controls showed 100% of viability. The images were captured using the DP-72 camera (Olympus Corporation, Tokyo, Japan). The experiments were performed in triplicate and repeated 3 times.

IV. DISCUSSION

Scorpion venoms are very effective in the treatment of several diseases. Hence, during many years scorpion venom had been used in traditional medicine in many countries (Gomes et al. 2010, Tobassum et al., 2018) for its properties as analgesic, anticancer. anti-inflammatory and antimicrobial (Almaaytah and Albalas 2014, Harrison et al. 2016). Studies about venom recovery in Androctonus finitimus and Hottentota tumulus scorpions kept in the laboratory, demonstrated better yield and quantity by electrical method than manual method. Also, it was revealed the influence of diet and temperature on venom production (Tobassum et al., 2018). However, there are others parameters affecting venom consistency such as sex, geographical location, age and time intervals for extraction (Pucca et al., 2014). Regarding this last parameters, it has been reported that extended periods of Cuban *R. junceus* venom collection was positively correlated with the regeneration of venom composition and the increase of cytotoxic effect against A549 lung cancer cells (Díaz-García et al., 2019). On the other hand, 200 individual molecular masses were identified in male and female *R. junceus* scorpion venom from which 63 are identical in both sexes (Rodríguez-Ravelo et al., 2015).

The present study, demonstrated that total protein concentration was similar among female, male and the mixture of both sexes of *R. junceus* scorpion venom. Moreover, the numbers of bands in all sex studied groups were identical from both electrophoretic conditions, with no statistically significant differences in the molecular weight in female and male scorpions. Nevertheless, unique bands were observed in each one of the sexes. Our results are similar with other achieved

with poisonous animals how Cerastes cerastes snake, where specific bands were found in male (42 and 39 kDa) and female (46 and 44kDa) venoms (Sarhan et al, 2017). However, in the study with Cerastes cerastes snake only was shown the MW in the electrophoretic analysis. While we also determined, the intensity of each one of the bands obtained under both electrophoretic conditions. Statistically significant differences were observed between both sexes (G1 and G2) for the intensity of the bands to 12 kDa (under non-reduced conditions) and 11 kDa (under non-reduced and reduced conditions).Previous proteomic studies with *R.junceus* scorpion venom disagree to current study where the scorpion venom was kept in captivity. That study evaluated by HPLC and mass spectrometry, the venom of females and males scorpions kept in its natural medium. As results, the relative abundance of identical components was different among the genders (Rodríguez-Ravelo et al., 2015). We have already reported the majority band below 14 kDa in the electrophoretic profile (Díaz-García et al., 2015). Several authors that work with scorpion venom have reported the presence of the mixture peptides in a diffuse area conformed by small molecules lower than 14 kDa, due to the little resolution power of SDS-PAGE technique, these peptides cannot be observed separated (Hernández-Betancourt et al., 2009).

This is the first study which compares the electrophoretic profiles of this venom from different sexes and the combination of both sexes (same proportion) from scorpion maintained under conditions of captivity. Previous studies with no same proportion have been done (Díaz-García et al., 2013; Díaz-García et al., 2017; Díaz-García et al., 2019). One of the important contributions of this study was the demonstration that morphological changes and loss of viability on the HeLa tumoral cell line; and the lack of cytotoxicity on the Vero cell line induced by R.junceus scorpion venom was independently of gender. This biological effect could be possible because the most abundant components are present in both sexes (Rodríguez-Ravelo et al., 2015). Also, the bands of the most intensity in all sex studied groups corresponded to proteins with low MW that they are the main responsible for their therapeutic potentialities. However, next studies are needed to compare this biological effect of venom from scorpions with different sexes with other tumor cells.

V. Conclusions

In our experimental conditions, there were similarities in the protein concentration and some differences in the electrophoretic profile of female, male and the combination of both sexes of *Rhopalurus junceus* scorpion venom. However, the cytotoxic effect of *Rhopalurus junceus* scorpion venom is maintained regardless of the sex of the scorpions on the HeLa tumor cell line.

Conflict of Interest

The authors declare no conflict of interest.

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Drinking-Water Quality and Intestinal Infectious Diseases in a Colombian Department, 2010-2016

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Materials and methods: A time-trend ecological study. The drinking-water quality of the National Institute of Health and the Institute of Hydrology, Meteorology and Environmental Studies was identified. The disease burden was calculated based on the mortality registered in the National Department of Statistics and the records of morbidity attended by the Social Protection Integrated Information System. The etiological agents reported in morbidity records and the observation of environmental conditions in the municipalities of the study were included. The disease burden was determined according to the methodology recommended by the World Health Organization (WHO).

Keywords: drinking-water quality, sanitation, intestinal diseases.

GJMR-F Classification: NLMC Code: WQ 256

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Drinking-Water Quality and Intestinal Infectious Diseases in a Colombian Department, 2010-2016

Dora Cardona Rivas °, MilitzaYulain Cardona Guzmán ° & Olga Lucía Ocampo López °

Abstract- Objective: To characterize the burden of intestinal infectious diseases attributable to drinking-water quality in 27 municipalities in the central region of Colombia.

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Results: High rates of potential drinking-water quality alteration were observed in 55% of the municipalities and high rates of drinking -water quality risk in 81%. During the period 12161.7 Disability Adjusted Life Years (DALY) were lost per million inhabitants, 42.5% corresponded to the years lost due to premature death in all age groups. The burden of disease attributable to the most affected were those over 60 years old. Although no significant correlation was found between the burden of disease and the drinking-water quality indicator, what is documented through drinking-water quality by region, microbiological results from reported cases and interviews with municipal officials corroborate this.

Keywords: drinking-water quality, sanitation, intestinal diseases.

I. INTRODUCTION

niversal and equitable access to safe and affordable drinking water is one of the major Sustainable Development Goals (SDGs) adopted by many countries worldwide (1). This objective has been part of the pronouncements and follow-up of the Pan American Health Organization for several decades (2); the Millennium Development Goals (UN) (3) and the Sustainable Development Goals and Agenda 2030 (ODS) (4). While there are advances in access to water resources and sanitation, inadequate water resource management, water pollution, and poor land use are some of the environmental factors that, along with social components such as housing, work and community are related to the burden of diseases such as diarrhea, lower respiratory infections, malaria and unintentional injuries (5,6). This calls for a process of monitoring the

Author α: Universidad Autónoma de Manizales. e-mail: dcrivas@autonoma.edu.co supply of drinking water to maintain human health and improve economic development (7).

In developed countries, 17% of mortality is attributable to environmental causes, while in developing countries this figure is 25% (8). The population without access to drinking water is forced to seek alternative sources of water lacking in the right conditions to make it drinkable, and so intestinal diseases are more frequent (9). A study assessing the Global Burden of Disease (GBD) shows that more than 25% of diarrheal diseases are due to factors such as inadequate drinking water and sanitation (10). Waterborne microbes are the most common etiological agents of intestinal parasitosis (11).

In Colombia, which is considered a developing country, the richness of its water heritage does not guarantee universal access to drinking water. The areas of the central Andean region where the main agricultural, industrial and mining activities take place, a significant proportion of the population in rural areas, although they have access to water resources, are exposed to water that does not meet the standards required for human consumption. One of the pieces of evidence for this is the association of morbimortality with water quality in the rural area of the municipalities that did not have a high enough drinking-water quality as established by the Colombian regulations (12).

Colombia has implemented the Water Quality Monitoring System for Human Consumption, which aims to verify and evaluate the public health risk of water through routine and continuous monitoring of its microbiological and physicochemical characteristics, in order to guarantee the population high quality water in accordance with the provisions of Resolution 2115 of 2007 and Article 12 of Decree 1575 of 2007. The Water Quality Risk Index (IRCA) for human consumption ranges from 0 to 100 points: 0 points when it complies with all acceptable values and 100 when it does not comply with any of them. The classification of the risk level according to the above criteria indicates the actions to be taken, as follows (13):

IRCA 0-5 Water is suitable for human consumption.

IRCA 5,1 – 14 The water is not suitable for human consumption, the risk is low and it is susceptible to improvement.

IRCA 14,1 – 35 Water is not suitable for human consumption. It presents high risk and requires management with service providers.

IRCA 35,1 – 80 Water is not suitable for human consumption. It presents high risk and requires management with service providers and health authorities.

IRCA 80,1 – 100 The water is unhealthy and unsuitable for human consumption. Management with health authorities is required at all levels.

The department of Caldas (Colombia), located in the Andean region, is one of the departments that presents high scores of drinking-water quality risk index for the population in rural areas. This article documents the characterization of the burden of intestinal disease attributable to drinking-water quality in the sub-regions of this department between 2010-2016 and the relationship with the infectious agents that affect a greater proportion of the population. The results can help guide interventions to increase the coverage of drinking water and make the achievement of sustainable development objectives feasible.

II. MATERIALS AND METHODS

A time-trend ecological study was carried out to determine the disease burden by intestinal infectious diseases attributable to the drinking-water quality, in a department of the central region of Colombia in the period 2010-2016. Data was obtained on mortality, morbidity by sub-regions, and indices of water quality and potential alteration of drinking-water quality in the department according to hydrographic zones.

III. MORBIDITY AND MORTALITY

Mortality and morbidity records for infectious intestinal diseases in Colombia are kept by the National Department of Statistics (DANE) and the Comprehensive Social Protection Information System (SISPRO), respectively, using the ICD-10 codes of the International Statistical Classification of Diseases of the Pan American Health Organization (PAHO) (14).

For the morbidity addressed, the codes included were A00 to A09 through which intestinal infectious diseases caused by bacteria, viruses, protozoa and others are identified. Prevalent cases of intestinal infectious diseases attended by health services were obtained using an algorithm that identified the patient only once to avoid duplication. For mortality, records of basic cause or direct cause or previous cause of death were obtained to ensure that all deaths occurred in each of the years 2010 to 2016 in each municipality of the department of Caldas.

IV. WATER QUALITY INDICES

The quality of water for human consumption is measured in Colombia through the Water Quality Risk

Index (IRC) that measures the physical, chemical and microbiological characteristics of water, which is periodically registered in the "Information System for the Monitoring of Water Quality for Human Consumption-SIVICAP". From SIVICAP (16), the IRCA values were obtained for each of the years under study in each municipality of the department of Caldas.

The Index of Potential Alteration of Water Quality (IACAL), is evaluated from the contaminating loads of organic matter, suspended solids and nutrients exerted by the domestic, industrial and agricultural sectors (17), which are registered periodically (18). IACAL values were obtained from the hydrographic areas of the department.

The identification of the problems related to drinking-water quality and the care of the water heritage were obtained through interviews with officials of the local entities responsible for environmental health in each municipality.

V. ANALYSIS

The annual percentages of mortality and morbidity addressed were calculated for each municipality, by year, sex and age groups, through the number of officially registered deaths as the numerator; and the population projection estimated by DANE for the respective year was used as the denominator. The percentages of mortality and morbidity were adjusted by sex and age, taking the population of Colombia in 2016 as a standard reference according to projections of the DANE census, 2005.

Years of life lost due to premature death.– YLL. This indicator was calculated by sex and age group for each year in two stages: first, the difference between each of the ages of death and life expectancy was obtained. This difference was multiplied by the number of deaths registered for each age. After this calculation, the sum of total YLL for all ages, by sex, department and for each year was recorded.

The formula used to calculate the YLL was the following:

The YLLs are obtained by adding the products of the number of deaths at each age and the difference between this age and a cutoff age.

YEARS OF LIFE LOST (YLL) =

- dx = number of deaths at each age
- ex = standard life expectancy for each age
- I = last age group

The YLL calculation used the life expectancy for each sex and age group according to the Princeton model life table, western family, level 26, modified, published by the Ministry of Health (19) in 2016 in the Asis (Health Situation Analysis) Bulletin. This decision was made to improve the comparability and interpretation of the measurements. For the 0-year-old and 1 to 4-year-old groups, in both men and women, life expectancies were averaged to form a 0 to 4-year-old group.

Years of life lost due to disability – YLD. These were calculated according to the proposal of the World Health Organization (WHO) in 2010 (20), based on the prevalence of the disease and the estimated time of disability generated by the event in the year.

For the calculations, the disease duration values obtained from the Colombia Burden of Disease Study 2005 (21) were used. The average disability per year (average time of disability) or fraction of the disability time of the event was obtained from the WHO (20). In the absence of a reliable differential standard, its value was considered similar for men and women, as well as constant throughout the period.

Burden of disease per year. This indicator, that integrates the time lost due to premature death and disability, was obtained by age group and sex, adding the YLL and the YLD of the analyzed event.

Systematization and review of the testimonies obtained from officials about problems related to water quality and the care of the water heritage.

Relationship between water quality and intestinal infectious diseases. The following analyses were performed: a) the correlation between drinkingwater quality and disease burden was calculated; b) the correlation between drinking-water quality and toilet and sewerage coverage was calculated; c) the infectious agents reported to SISPRO (Integrated Social Protection Information System) were identified, separated by region; d) The relationship between drinking-water quality and the reports on water coverage and quality declared by the responsible officials of each municipality and subregion was analyzed.

VI. Results

Drinking-water quality results are presented initially, followed by disease burden results.

a) Drinking-water quality

Potential Alteration of Water Quality Index (IACAL) "is the reference of the pressure on the conditions of water quality in the superficial hydric systems of the country". It is calculated based on polluting loads in terms of organic matter (BOD and COD), suspended solids (TSS) and nutrients (Nitrogen and phosphorus). The Colombian Environmental Information System (SIAC) has available the IACAL information from the National Water Study, ENA (shown in Figure 1) for an average year in the hydrographic subzones of interest in the department of Caldas. The potential for water contamination is between low and high. It is observed how the south-central region, the most urbanized area of the department, presents a high index of potential alteration of the drinking-water quality; it is followed by the lower west, upper west region and Magdalena Caldense. The lowest index corresponds to the municipalities of the Upper East region. https://terridata.dnp.gov.co/index-app.html#/mapas



Source: Own Elaboration Based on Information from the Colombian Environmental Information System (SIAC). http://sig.anla.gov.co:8083/

Figure 1: Potential Alteration of Water Quality Index in the department of Caldas

The behavior of the IRCA by municipality (locality) observed during the study period is evidenced in figure 2; only two municipalities present values close to 5. The other municipalities present values between 20 and 80 and more that compromise the viability of the drinking water; and they even become unviable sanitary as in the years 2013 and 2014.



Figure 2: Water Quality Risk Index 2010-2016 Municipalities of the Department of Caldas

b) Burden of Disease from Intestinal Infectious Diseases

Figure 3 shows the adjusted mortality ratio (per million inhabitants) due to intestinal infectious diseases in the population by age group. Mortality occurs from 0

to 4 years of age with a stable behavior until 60 to 69 years of age where it increases; the highest proportions correspond to people over 70 years of age. A trend towards an increase in said mortality is observed in all years, except in 2015.



Figure 3: Proportion of Mortality Adjusted by Sex and Age due to Intestinal Infectious Diseases. Caldas 2010-2016

The proportions of morbidity treated per million inhabitants are shown in Figure 4. Morbidity is higher in age groups up to 30 years where it begins to decrease. The highest proportions of morbidity treated in people between 70 and 79 years stand out.



Figure 4: Proportion of Morbidity Treated Adjusted by Sex and Age for Intestinal Infectious Diseases. Caldas 2010-2016

Mortality and morbidity previously exposed resulted in 12,161.7 disability-adjusted life years lost (DALY) in the years 2010 to 2016. Of these, 42.5% correspond to years lost due to mortality, the rest correspond to the disability generated during the event. The behavior of the burden expressed in DALY per million inhabitants according to regions of the department is observed in figure 5. The regions most compromised with the burden of disease due to intestinal infectious diseases are the south-central region, which corresponds to the most urbanized area, and the Magdalena Cal dense area that is a region characterized by a high tourist influx. An estimate of the burden attributable to water quality as reported by Prüss *et al.* (22) reveals that the consumption of non-potable water alone would be responsible for 34% of the loss of years of life due to intestinal infectious diseases. Taking into account the availability of poor quality water, as well as the deficiencies in sanitation and sewerage, the weight of the burden attributable to the conditions studied would reach 58%, that is, 7053.8 years of life lost due to this cause. This relationship is strengthened even more if the microorganisms reported in the cases of intestinal infectious diseases observed below are analyzed further on.



Figure 5: Proportion of Disability-Adjusted Life Years (DALY) associated with Intestinal Infectious Diseases. Caldas 2010-2016
In addition to the behavior of IRCA, the microorganisms reported to SISPRO are the possible relationship between epidemiological behaviors with poor drinking-water quality in the diagnosis of intestinal infectious diseases in the period of interest. (Table1). In all regions, *diarrhea and gastroenteritis of allegedly infectious origin* range from 81.93% in the south-central region to 93.24% in the upper West region between the years 2010 and 2016. In addition, *Shigellosis of unspecified type; amebiasis, unspecified, viral intestinal infection* and *other viral enteritis* are also reported.

is emphasized that the drinking-water quality from the distribution systems in most municipalities has a high IRCA resulting in unsafe drinking-water for much of the period of interest. Albeit the SSPD defines the public water distribution system as the safe drinking-water, including complementary activities of raw water collection, processing, storage, conveyance and treatment; in the case of rural water systems, activities are mainly for raw water collection, storage and conveyance with poor or no treatment; or failures in drinking-water quality management processes.

Although this behavior could be associated with other factors such as food consumption and hygiene, it

Table A lafa d'a	A		files Deserves serves	
	Mannie Robor	\sqrt{Sup} rogione o	t tha Lianartmant at	1 2020 2010 2016

Infectious Agent	High West	High east	Low West	South center	Magdalena Caldense	North
Cholera due to Vibrio cholerae O1, cholerae biotype/tor/unspecified			х	х	х	х
Typhoid fever A, B, unspecified		х	х	х	х	х
Enteritis, septicemia, unspecified due to Salmonella	х	х	х	х	х	х
Shigellosis due to Shigelladysenteriae, flexneri, boydii, sonnei, and other shiguella infections agents	х	х		x	х	х
Infection due to enteropathogenic / enterotoxigenic, enteroinvasive / enterohaemorrhagic and other Escherichia coli due to E. coli			х	х	х	
Enteritis due to Campylobacter				х		
Enteritis due to Yersinosis enterocolitica					х	
Enterocolitis due to Clostridium difficile			х	х	х	
Other specified bacterial intestinal infections	х	х	х	x	х	х
Forms of amoebiasis: acute, chronic intestinal, colitis, intestinal ameboma, amoebic abscess.	х	х	х	х	х	х
Balantidiasis	х	х		х	х	
Giardiasis giardalambia infection	х	х	х	х	х	х
Isosporiasis		х				
Intestinal disease due to unspecified protozoa			х	x	х	х
Enteritis due to Rotavirus / Adenovirus / Norwalk agent / other viral agents	х	х	х	х	х	х
Diarrhea and gastroenteritis of allegedly infectious origin	х	x	x	х	x	x

Source: Authors' Own Elaboration from cubos.sispro.gov.co SGD CUBOS PER-atencionesensalud.odc 2010-2016

Although the results show a low correlation (R: - 0.246) and not statistically significant correlation between the burden of disease (DALY) and the average IRCA; a negative correlation was observed (R: -0.625 with p = 0.0000) between the average of the IRCA with the average of rural urban cleaning. This evidences the negative effect of the poor basic sanitation conditions on the safe drinking water. In addition, the information provided from the municipal officials' interviews revealed the main limitations in the implementation of public

policies and programs aimed at guaranteeing a healthy environment and the quality of life of the population. Some of the testimonies of the said limitations by subregion are described below.

Subregions	Municipalities	Environmental problems
High West	Philadelphia, La Merced, Riosucio, Supía, Marmato	All municipalities lack drinking water in rural areas. Only one of them has a Wastewater Treatment Plant (WWTP)
High east	Marulanda, Manzanares, Marquetalia, Pennsylvania	Lack of drinking water in rural areas. The treatment plants supply the municipal capitals. Growth of the agricultural frontier and pollution of the water heritage.
Low West	Anserma, Risaralda, San José, Viterbo, Belalcázar.	Drinking water only in some rural communities. Lack of WWTP, growth of the agricultural frontier, poor inorganic waste management. Intestinal problems are identified due to consumption of polluted water with waste from coffee treatment.
South center	Manizales, Chinchiná, Palestina, Villamaría, Neira.	Limited access to drinking water in rural areas, some are supplied by Empocaldas and Aguas de Manizales. Lack of WWTP. In some places there is poor disposal of solid waste into water sources.
Magdalena Caldense	Samaná, Norcasia, La Dorada, Victoria.	Lack of drinking water in rural areas. Lack of WWTP. Growth of agricultural frontier Poor waste disposal in green areas and water sources due to tourism

Source: Interviews to Officers Responsible for Environmental Health

VII. Discussion

This time-trend ecological study on the relation between the drinking-water quality and the burden of disease caused by the intestinal infectious diseases was conducted from the analysis of the registries of water quality of the SIVICAP and of the reported morbidity and mortality reported by DANE and SISPRO in a department of the central region of Colombia.

Although the supervision of Servicios Públicos Domiciliarios (SSPD) reports an increase in the coverage of drainage (24) and in the monitoring of the drinkingwater quality (25), it does not guarantee the access to the drinking water for human consumption because the information is usually about the municipal capitals without including the rural communities and dispersed rural area. This limited information disregards the other water recovery (not only human consumption) as the domestic use, the use by the farming and mining sector, inadequate treatment of residual waters, and the growth of tourism in some areas affecting the preservation of the ecosystem (26). Although the WHO (27) in 2015 highlighted the efforts of the countries to increase the drinking water coverage and basic drainage, in 2019 it indicated that around 2 billion people worldwide consumed polluted water with faeces (28). Similarly, Interamerican Networks of Academies of Sciences (29) (IANAS) in that same year stated that despite of the number of efforts made by the different governments since the 70s, the growth of water and drainage services was still too poor to satisfy the needs of quality and guantity for peri-urban and rural communities

The aforementioned is evidenced through microorganisms found in patients with diarrhea or allegedly clinical diagnoses to SISPRO, that raise a

possible relation with the quality of the drinking water, because the values of IRCA in all the municipalities indicate a possible risk of diseases due to the consumption of the water. It is possible to indicate that studies conducted on drinking water in Mexico showed the presence of parasites and the poor effectiveness of its treatment (30).

In the analysis of drinking-water quality in Colombia, Roldán *et al* (31) point out the importance of knowing how it affects the population and its burden of disease thus the greater relevance to this study. It is evident that despite the global commitments and the regulations in force in the country and the region, there is still a gap between the guidelines and the results. The implementation of the policies despite the current regulations does not achieve the expected results.

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Assessing Knowledge, Attitude and Practices (KAP) towards COVID19: A Cross-Sectional Study in Kenya

By Waiguru Muriuki, Brian Muriithi, Kamande Duncan, Austin Muriuki & Grace Kihika

Abstract- Covid-19 is a severe acute respiratory disease that has rapidly spread across the world originated China in December 2019. The main symptoms of a person infected with corona virus are fever, dry cough, shortness of breath, fatigue, dyspnea and myalgia. One of the main tool employed to control the pandemic is providing the community with correct information about the disease. High knowledge, right attitude towards Covid-19 and are adhering to suggested practices is the most effective approach to control community transmission. It is against this background that this study sought to assess Covid-19 knowledge, attitude and practices (KAP) among Kenyans. An online cross- section survey was used to collect data between July 26-31, 2020. From the findings, 9.1 % of the respondents indicated that their relatives, friends or themselves had contracted Covid-19. There is high knowledge of Covid-19 in Kenya, with 83.97 % (82.4,85.54) aware of its symptoms and preventative measures.

GJMR-F Classification: NLMC Code: W 84.5

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Assessing Knowledge, Attitude and Practices (KAP) towards COVID19: A Cross-Sectional Study in Kenya

Waiguru Muriuki^a, Brian Muriithi^a, Kamande Duncan^e, Austin Muriuki^a & Grace Kihika[¥]

Abstract- Covid-19 is a severe acute respiratory disease that has rapidly spread across the world originated China in December 2019. The main symptoms of a person infected with corona virus are fever, dry cough, shortness of breath, fatigue, dyspnea and myalgia. One of the main tool employed to control the pandemic is providing the community with correct information about the disease. High knowledge, right attitude towards Covid-19 and are adhering to suggested practices is the most effective approach to control community transmission. It is against this background that this study sought to assess Covid-19 knowledge, attitude and practices (KAP) among Kenyans. An online cross- section survey was used to collect data between July 26-31, 2020. From the findings, 9.1 % of the respondents indicated that their relatives, friends or themselves had contracted Covid-19. There is high knowledge of Covid-19 in Kenya, with 83.97 % (82.4,85.54) aware of its symptoms and preventative measures. With regard to containment of the disease, 55 % are optimistic than measures instituted by Kenyan government will eventually control its spread. Daily MoH briefing (56%) and mainstream media (55%) are the main and trusted sources of information about Covid-19. Despite, most persons indicating they wore mask and washed hands while in crowded place, 60% indicated other people were not observing the measures. Gender, age group, education level and occupation influence the Covid-19 knowledge level.

I. BACKGROUND

he covid-19 (coronavirus disease) is a severe acute respiratory Syndrome Coronavirus 2 (SARS-CoV-2), which originated from Wuhan city, China in December 2019 (Wu et al., 2020). Rapid transmission is mainly through close contact with an infected person (Zhou et al., 2020). However, details about the disease are continuously evolving and, as such, infections may be occurring through other routes. The main symptoms of a person infected with corona virus are fever, dry cough, shortness of breath, fatigue, dyspnea and myalgia. (Bajema et al., 2020; Huang et al., 2020; Zhou et al., 2020) Since the outbreak in China, the disease has spread widely and speedily to other parts of the world. It has spread to over 200 countries and was declared a global pandemic by World Health Organization (WHO) on March 11, 2020 (Cucinotta & Vanelli, 2020). By the end of July 2020, there were more than 17 million positive cases recorded, with at least 670, 000 deaths globally.

In Kenya, the Ministry of Health (MoH) confirmed the first corona virus case on March 12, 2020. In the same month, President Uhuru Kenyatta directed the implementation of preventative measures to reduce human-to-human transmission. These measures included restriction of international travels from and to countries with corona virus cases, closure of learning institutions, working from home except for essential services personnel, insistence on cashless transactions, and prohibition of congressional meetings, among others.

In the beginning of May 2020, WHO detected high and large-scale community transmission in many African countries. WHO advised respective governments to institute measures to curb human-to human transmissions. Due to community transmission, global and local experts projected over 2 million deaths from the pandemic in Sub-Saharan countries in the worstcase scenario of unmitigated spread of the virus (Austrian et al., 2020). This necessitated the Kenyan government to institute movement restrictions -cessation of movement- in areas which the MoH considered to be infection hotspots (Nairobi, Mombasa and Kilifi). In addition, nationwide curfew from 7.00 p.m to 5.00 a.m countrywide was declared to limit human movements and interactions.

Despite the containment measures put in place, the number of Covid-19 cases and deaths have steadily increased with over 19, 000 positive cases and 300 deaths by the end of July 2020. Earlier, on July 6, President Uhuru Kenyatta lifted the cessation of movement in the said Covid-19 hotspots. As a result, the Ministry of Health initiated a campaign to promote personal and public health behavior, such as regular hand washing and observing social distance in crowded places. Despite many achievements from this approach, the challenge of misinformation, mainly in form of promotion of unscrupulous Covid-19 treatments and ineffective preventative methods on social media (Facebook, WhatsApp, Instagram, Twitter among others), have presented a serious hurdle to the fight against the spread of the virus (Limaye et al., 2020; Pennycook et al., 2020; Person et al., 2004; Wang et al., 2020).

The knowledge, attitude and practices (KAP) towards Covid-19 disease largely determine the

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preparedness of Kenya to concede behavioral change advocated by Ministry of Health. KAP studies provides the foundation for interventions required to correct misinformation and misconceptions about Covid-19. Therefore, evaluating the knowledge, attitude and practices about the disease among Kenyans would be a better basis for providing insights to improve awareness and help in the development of preventative strategies and programs. The lessons from SARS outbreak is that knowledge and attitude towards an outbreak determines the level of panic and emotion, which can consequently affect and complicate containment strategies (Limaye et al., 2020; Person et al., 2004; Wang et al., 2020). This study will provide a community's status with regard to Covid-19 knowledge, attitude and practices among Kenyans. In addition, the findings of this study will help the government to develop strategies to improve public and personal hygiene in the community.

II. Methods

a) Study Design

A quantitative approach was employed to achieve the objective of the study. A survey was used as a means of collecting data due to its many advantages including high accessibility to a large population (van Griethuijsen et al., 2015). A cross-sectional study using data collected through an online self-reported questionnaire seemed appropriate to collect data in the current context of restricted movements. To assess the level and association with social factors of Covid-19 knowledge, attitude and practices among Kenyans, descriptive statistics (percentages and means) and multivariate regression were employed.

b) Data collection

The cross-sectional survey was undertaken between July 26-31, 2020. Since it is not feasible to undertake nationwide sampling during this period, the research opted to use an online survey using Google Form, where only persons above the age of 18 years were eligible to participate. The numerous shortcomings encountered with internet-mediated survey were high

non-response rate and inaccessibility by a section of the targeted population (Mirabeau et al., 2013). (Dusek et al., 2015; Mirabeau et al., 2013) propose different strategies to downplay the weakness of online survey, which include direct contact, referrals, and affiliation. In light of these challenges, researchers employed many approaches to reach many respondents across the country within the one-week data collection period. For this study, community leaders, social media influencers and mobilizers were involved in broadcasting and sharing of the survey on their social media platforms (Facebook and WhatsApp). Facebook and WhatsApp were mainly used to share the survey since they are the most popular social media platforms in Kenya (Irungu et al., 2015). Clicking the link to the survey was deemed as a consent to participate. From the process, 353 respondents clicked the link and submitted the survey. The data was then analyzed to address the objectives of the study.

c) Knowledge, attitude and practices Indicators

The survey tool consisted two parts: demographic characteristics and KAP related questions. The general characteristic of the respondents included gender, age group, education level, marital status, occupation and place of residence (either urban or rural).

The questionnaire used in this study was adopted from the tool that was previously tested and used in China (Zhong et al., 2020). However, the tool was reviewed to align to Kenyan context. There were 10 questions to test respondent's knowledge on Covid-19: K1-K9. The knowledge score was then divided by 9, as it ranges between 0 and 1. The aims of the study were to understand Covid-19 attitude among Kenyans, their confidence on instituted measures to control the spread of the virus, and whether they believe the disease will eventually be controlled (K10-11). With regard to practices, it was essential to understand whether one had visited crowded places and whether they were observing the preventive measures (K12-13). (See Table 1 below).

	Question	Option
K1	Wearing mask when in public	(No), (Yes), (I don't know)
K2	Regular handwashing	(No), (Yes), (I don't know)
K3	Maintaining social distance in public spaces	(No), (Yes), (I don't know)
K4	Staying indoors and avoiding crowding places	(No), (Yes), (I don't know)
K5	Not a MUST for children to take measures to prevent contacting Covid-19?	(No), (Yes), (I don't know)
K6	Isolation of infected persons is effective way of reducing the spread of the dis	(No), (Yes), (I don't know)
K7	All COVID-19 positive person(s) show symptoms	(No), (Yes), (I don't know)
K8	There is currently not cure but early symptomatic and supportive treatment can h	(No), (Yes), (I don't know)

Table 1: Knowledge, attitude and practices Indicators

K9	The main symptoms of COVID-19 are fatigue, fever and a dry cough	(No), (Yes), (I don't know)
K10	Do you agree that COVID 19 will be eventually be controlled?	(No), (Yes), (Maybe)
K11	Do you believe the measures instituted by Kenyan government will control the spread of the virus?	(No), (Yes), (Maybe)
K12	In the recent days, have you gone to any crowded places?	(No), (Yes), (Maybe)
K13	If "YES", indicate whether you observed the set preventive measures	(No), (Yes)

d) Limitation of the study

Sampling was done through convenience sampling through a network of researchers who were encouraged to share the survey on social media platforms (Facebook and WhatsApp). Therefore, there may be a bias since those who are not on such social media platforms were not able to participate in the study. In addition, with regard to age distribution in Kenya, the sample of the study had an overrepresentation of persons below the age of 35 years. The under-representation of a section of the target population may have derailed the generalization of the findings (Mortel, 2008; Sandelowski, 1995). As such, a more systematic and inclusive sampling approach should be employed to improve the level of representation and generalizability Covid-19 of knowledge, attitude and practices in Kenya.

Another limitation of this study was the likelihood that respondents were likely to give desirable response. Since it is a self-reported survey, respondent were likely to give answers about attitude and practices based on what they perceived was expected of them (Mortel, 2008; Nazer et al., 2017).

III. Results and Discussion

A total of 353 participants completed the survey. Majority of the respondents were below 35 years of age (91.5%), 232 (65.7%) were males, 293 (83.0%) had a bachelor degree and above, 64 (18.1%) respondents indicated to be unemployed, and 217 (61.5%) said they live in urban settings (See Table 2 below).

General characteristics		N=353	Knowledge score of Covid-19 against demographic characteristics
Conder of the respondent	Female	121 (34.3%)	0.8397 [0.8091,0.8702]
Gender of the respondent	Male	232 (65.7%)	0.8397 [0.8216,0.8577]
	35> years	30 (8.5%)	0.8567 [0.7862,0.9272]
Age group	<35 years	323 (91.5%)	0.8381 [0.8220,0.8541]
Education Level	Primary/Secondary School	60 (17.0%)	0.7683 [0.7166,0.8201]
	University	293 (83.0%)	0.8543 [0.8389,0.8696]
Marital Statua	Married	93 (26.3%)	0.857 [0.8205,0.8935]
Marital Status	Not married	260 (73.7%)	0.8335 [0.8164,0.8505]
	Employed	102 (28.9%)	0.8716 [0.8424,0.9007]
Perpendents' Occupation	Self-Employed	37 (10.5%)	0.8541 [0.8085,0.8996]
Respondents Occupation	Student	150 (42.5%)	0.8227 [0.8013,0.8441]
	Unemployed	64 (18.1%)	0.8203 [0.7730,0.8677]
Place of residence (Rural or	Rural	136 (38.5%)	0.8279 [0.7996,0.8563]
Urban)	Urban	217 (61.5%)	0.8470 [0.8284,0.8656]

Table 2: Demographic characteristics of Survey Respondents and knowledge score (with confidence interval)



Figure 1: Source of Covid-10 Information

a) Community's source of Covid-19 Information

While the threat of Covid-19 has triggered a serious global health concern, of greater danger is the fear surrounding the disease that is fueled by widespread of health misinformation. According to (Wang et al., 2020; World Health Organization, 2020), distinguishing facts from outright health misinformation during an outbreak is a daunting task especially in the

current era of social media. In the current situation of Covid-19 outbreak, 56% of Kenyans indicated to receive information on Covid-19 from mainstream media (Radio, newspapers, and Television), 55 % from daily MoH's briefing, while 55% source information from social media platforms (Facebook, Instagram, Twitters etc) (See Figure 1 above).



Figure 2: Level of Trust on source of Covid-19 information

The level of trust of information from available sources were varying. Among the popular sources of information, daily briefing by the Ministry of Health was the most trusted source of Covid-19 information with 90% highly or somewhat trusting the information given on this forum. For those who get updates about the pandemic from mainstream media 87% highly or somewhat trust the conveyed information. However, despite 55% of the respondents sourcing their information from social media platforms, only half of those (50%) highly trust the information (See Figure 2 above). Knowledge and perception of Covid-19.

Overall, the average knowledge score of Covid-19 symptoms and practices is 0.8397 [0.8239,0.8554], indicating high knowledge about Covid-19 pandemic. However, the average knowledge level changes with sociodemographic characteristics of the respondents.

Distribution, by proportion, of respondents for each knowledge indicator is shown in Table 4 below. Overall, 93% of the respondent indicated that they know the main symptoms of Covid-19, while 4% were not sure. With regard to whether the measures instituted by the Kenyan government will eventually control the spread of the virus 55% are optimistic it will be controlled, 27.2% are not sure while the rest (17. 8 %) do not believe the disease will be controlled (See Figure 3 above).



Figure 3: Attitudes towards Preventive Measurce

The main symptoms of COVID-19 are fatigue, fever and a dry cough.	6%	85%	9%
	No	Yes	l don't know
Wearing mask when in public	2%	96%	3%
Regular handwashing	1%	96%	3%
Maintaining social distance in public spaces	3%	96%	2%
Staying indoors and avoiding crowding places	7%	89%	4%
Not a MUST for children to take measures to prevent contacting Covid-19?	87%	6%	7%
Isolation of infected persons is effective way of reducing the spread of the disease	4%	93%	3%
All COVID-19 positive person(s) show symptoms	75%	12%	13%
There is currently not cure but early symptomatic and supportive treatment can help patient(s) recover	6%	85%	9%

Multiple linear regression model (Table 4 below) showed that female gender (vs male, coef. =00601, P=0,014), age group 34+ years (vs <35 years, coef. =0.3998, P=0.000), level of education of primary/secondary (vs).

University, coef.=0.2685,P=0.000) and employed occupation status (vs not employed, coef. = 0 .2044, P=0.000) were significantly associated with the level of knowledge score.

Table 4: Results of multiple linear regression analysis on sociodemographic factors associated with knowledge on Covid-19

Respondent characteristics	Coef.	Std. Err.	t	P>t	[95% Co	onf. Interval]
Gender (Female vs Male)	0.0601	0.0243	2.47	0.014	0.0123	0.1079
Age group (35+ vs <35 years)	0.3998	0.0373	10.71	0.000	0.3264	0.4733
Education Level (Primary/Secondary vs University)	0.2685	0.0283	9.5	0.000	0.2129	0.3241
Marital status (Married vs Not Married)	0.0146	0.0298	0.49	0.624	-0.044	0.0733
Occupation (Unemployed vs Employed)	0.2044	0.0275	7.43	0.000	0.1503	0.2585

b) Practices towards Covid-19

Of the all the respondents, half of the respondents (50%) indicated to have visited a crowded place in the recent past. In crowded places, 91 % indicated to have worn masks, 67 % maintained the proposed social distance and 83 % applied sanitizers regularly. However, 60 % of the respondents indicated that other persons were not observing the measures. Evidently, the failure of the majority of Kenyans to adhere to the recommended Covid-19 preventive measures may explain the high community-to-community transmission experienced in Kenya.

IV. CONCLUSION

It is not in doubt that that knowledge, attitude and practices among Kenyans is the main determinant of how the pandemic will affect the community. This study sought to assess the knowledge, attitudes and practices of Kenyans towards Covid-19. To achieve the objectives of the study an online cross-sectional survey was applied. In Kenya, where the population is predominantly youthful and educated, the level of knowledge about the Covid-19 symptoms and preventive measures was evidently high. From the study, it is evident that most respondents are knowledgeable about Covid-19 (83.97 %). Daily briefing by the Ministry of Health (MoH) and mainstream media were posited as the main sources of information about the pandemic in Kenya. About observing the proposed measures in crowded places, despite majority indicating they observed the measures, there was a significant proportion (60%) of respondents reporting that other persons were not observing the same. Only half of the respondents believed that the pandemic will eventually be control through the measures instituted by the Kenyan government. Sociodemographic characteristics, including gender, the level of education and occupation, were shown to influence the level of Covid-19 knowledge.





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COVID: We can Prevent Hospitalizations and Save Lives with Information that is Already Published

By Sharon Hausman-Cohen

Introduction- In the face of the current pandemic, I believe that by using already published scientific studies, we can decrease the impact, negative health effects of COVID and dramatically decrease Coronavirus related hospitalization rates. I believe we can also change the perception and reality of coronavirus into a treatable illness, generally managed in an outpatient setting.

In order to achieve these goals, we need to look towards already completed and published studies from across the world for knowledge regarding vitamin and supplement therapy that have evidence showing benefit in the prevention and treatment of COVID-19 related illness.

As a physician and scientist, the importance of evidence-based medicine has been drilled into me from the very beginning of my training at Harvard, more than 25 years ago.

GJMR-F Classification: NLMC Code: W 84

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I. INTRODUCTION

n the face of the current pandemic, I believe that by using already published scientific studies, we can decrease the impact, negative health effects of COVID and dramatically decrease Coronavirus related hospitalization rates. I believe we can also change the perception and reality of coronavirus into a treatable illness, generally managed in an outpatient setting.

In order to achieve these goals, we need to look towards already completed and published studies from across the world for knowledge regarding vitamin and supplement therapy that have evidence showing benefit in the prevention and treatment of COVID-19 related illness.

As a physician and scientist, the importance of evidence-based medicine has been drilled into me from the very beginning of my training at Harvard, more than 25 years ago. I agree with this principal and firmly believe that we must have rationale and good studies backing our actions as part of medical decision making. Replicated, large double-blind placebo controlled human trials are the gold standard in medicine.

However, sometimes in the science and application of medicine we have to use the foundational information from smaller randomized studies. observational studies or studies done in similar conditions. Why? Because the predominating circumstances do not allow for these large studies to be funded and replicated in a timely fashion. Ebola is an example where a lot early evidence had to be used in order to save lives, and it worked! One of my family physician colleagues, who was volunteering in Africa was, in fact, the very first person saved by the use of interventions that were still being studied. Had he waited for final larger formal trials to occur he would have died. Coronavirus is also one of these situations. The interventions discussed below, however, are not early or experimental. They are well studied compounds and supplements that are safe, over the counter, and used routinely in other situations.

If all were ideal, and in order to be scientifically rigorous, there would be enough time and money for clinical trials to be repeated. The goal of these trials would be to firmly demonstrate that the supplements or

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vitamins that are being studied are highly effective in different Covid-19 settings. This is what evidence-based medicine is all about. However, currently there is an urgent need for *medical recommendations and leadership from our medical community*. People are dying or becoming ill at a pace that is more rapid than what science can study and prove. Yes. The studies absolutely do need to be done. But what can we do in the meantime?

Here are a few examples of excellent, evidencebased, studies for vitamins and supplements that have good safety and efficacy in human trials.

II. VITAMIN D

Data cited below (Alipio, 2020) showed that just by having normal vitamin D levels, an individual increases their chances of having a mild outcome rather than a critical outcome by 19.6 times!

This same study showed, that 95.8% of individuals who were critically ill in ICU or who died, had low vitamin D levels < 30 ng/ml with the majority of them having levels < 20 ng/ml. To achieve a vitamin D level of > 30 ng/ml, for most people, it requires only 2000 IU (50 mcg) daily. There is virtually no downside to replacing vitamin D and the institute of medicine has declared that up to 4000 iu daily is safe. Additionally, ideal vitamin D levels are known to be associated with less colon cancer, breast cancer and lower rates of heart disease and osteoporosis. There are now many other published studies and reviews on the topic coming out of Israel and England, with the conclusion that "there is nothing to lose from the implementation (of widespread encouragement for taking vitamin D), and potentially much to gain. (Martineau, A 2020)

While proactively giving vitamin D for prevention makes the most sense, other studies have shown that even in patients who are in hospital with coronavirus, giving 1000 IU of vitamin D daily (along with 150 mg magnesium and 500 ucg B12) was shown to decrease required subsequent oxygen therapy compared to controls dramatically; lowering the likelihood of needing oxygen by 44%. In fact, many hospitals across the country have instituted something called the "MATH Protocol" which includes vitamin D in coronavirus admission orders. While implementing the "MATH Protocol" nationwide in hospitals does makes sense, implementing a prevention strategy to encourage all citizens to take adequate vitamin D supplementation makes even more sense. Its low cost and highly cost effective.

III. Melatonin

Low dose melatonin has been shown to improve viral immunity, decrease lung inflammation and early evidence also supports that it can decrease symptoms of acute respiratory distress syndrome or ARDS. (Zhang, 2016, Zhang, 2020) ARDS is the true killer when it comes to COVID-19. ARDS happens when a severe bacterial infection or an aggressive virus like COVID sets off an inflammatory cascade that causes swelling or fluid buildup in the lining of the lungs. The fluid in the lungs from ARDS makes it hard to get oxygen into the blood and is what triggers shortness of breath and low oxygen levels frequently seen in Covid-19. ARDS is what causes people to require oxygen, or in worst case scenarios, ventilators. Melatonin levels decline as individuals age. Replacing melatonin to the levels needed to suppress lung inflammation requires less than one milligram a day. Melatonin is another intervention that is both safe and cost effective. It may be appropriate, in particular, for individuals over 50.

IV. Resolving

As discussed above, the true killer in the Coronavirus pandemic is not the virus itself but the cytokine storm that occurs in response to the virus. Cytokines are chemical messengers released from cells that are damaged by viruses, bacteria or other causes, and then trigger inflammation in the lungs and throughout the body. The cytokine storm is ultimately what causes acute respiratory distress syndrome. "Resolvins" (derived from fish) act to prevent lung inflammation or cytokine storm and thus to prevent ARDS. Resolvins, also called Pro Resolving Mediators, work by activating the anti-inflammatory process. They can also stop and reverse lung damage in ARDS and promote better outcomes and faster recovery. The advantage of resolvins over the more classic antiinflammatory compound of steroids is that they do not suppress the immune system or weaken tissue. In fact, they trigger repair of tissue as they promote the resolution of inflammation.

Many of the late complications of Covid-19, such as brain fog and increased risk of stroke and organ dysfunction are due to higher blood clotting risk being triggered by the virus. Resolvins help decrease the risk of other life-threatening complications from COVID19 including decreasing the clotting response and promoting clot removal. While resolvins are moderately expensive compared to vitamin D and melatonin, a course of treatment is still far less expensive than even an urgent care visit.

The science behind resolvins was so important that lead researcher, Dr. Charles Serhan of Harvard, has been given many awards for this work and has even been nominated for a Nobel Prize.

V. Pulse Oximeter

By having a pulse oximeter at home (a \$20-\$40 device that measures blood oxygen through your fingernail) oxygen levels can be monitored and COVID can be managed via telemedicine from the comfort of a patient's own home the vast majority of the time. While a pulse oximeter is not a treatment for coronavirus, this may be a new tool, like a thermometer, that is worth encouraging citizens to have and know how to use.

Given the knowledge in the published medical literature for safe simple interventions with good research, the next questions are these: How do we get these interventions to be known amongst physicians and community members nationwide? How do we as a country come together and study these strategies to move closer to COVID being a treatable illness – generally managed in an outpatient setting?

If we can prevent cytokine storm and ARDS, Covid-19 could be managed via telemedicine (with pulse oximeter) from the comfort of a patient's own home the vast majority of the time. The human and economic consequences of this paradigm shift would be huge. My purpose in writing this editorial is to encourage our leadership, medical and research institutions and individuals across the world to come together and evaluate and embrace what has already been shared in the published medical literature.

I believe, we as a country, should be investigating these options further; discussing them in the news and perhaps even *providing appropriate supplements our vouchers for supplements and preventive tools along with stimulus checks to our citizens across the country.* One concern during this epidemic is that our minority populations have been most severely affected. While part of the reason may be socioeconomic, and even genetic predispositions towards inflammation, vitamin D levels are known to be particularly low in individuals with darker skin or who suffer from obesity.

One option to help keep minorities and all citizens healthy would be to offer, as part of community health center offerings or the stimulus package, preventative tools.

A low cost "Corona Pack" could contain a pulse oximeter, Vitamin D, low dose Melatonin, and resolvins. This along with an educational campaign could make a tremendous difference in helping people avoid hospitalizations for Covid-19. Physician and public health education are imperative for this to work.

Implementing these low-cost strategies into prevention and even treatment regimens of coronavirus could potentially decrease the rates of hospitalization. Perhaps, even more importantly, education is empowering and would help to decrease the anxiety and fear surrounding COVID-19. These sorts of simple educational campaigns with low cost and high potential yield options could help restore our nation with a sense of hope, as well as physical and economic wellness. The human and economic consequences of these simple and inexpensive actions would be a benefit to all of society.

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Study of Knowledge, Attitude and Practice Regarding N-COVID-19 among Health Care Providers working in Tertiary Care Hospital

By Dr. Padmaja Kanchi & Dr. Subodh Kanchi

Abstract- The current Pandemic N-COVID-19 is taking a toll on health care providers all over the world as it is spreading by leaps and bounds. India is standing second in the world in case of the maximum number of patients. Hence we conducted a knowledge, attitude and practice study to prevent N COVID-19 among health care providers themselves working in tertiary care hospitals of a Medical College.

AIM: To find out the awareness regarding corona virus among health workers working in tertiary care hospitals.

Objective: To find out hygienic practices practiced by the participants.

Keywords: N-COVID 19, awareness program, preventive measures.

GJMR-F Classification: NLMC Code: W 84

STUDY OF KNOWLE DGE ATT IT UDE AN OPRACT I CERE GARDINGNCOVIDI 9 AMONGHEALTHCAREPROVIDERSWORKING INTERTIARYCAREHOSPITAL

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Dr. Padmaja Kanchi^a & Dr. Subodh Kanchi^o

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AlM: To find out the awareness regarding corona virus among health workers working in tertiary care hospitals.

Objective: To find out hygienic practices practiced by the participants.

Methodology: A pre-structured validated proforma was prepared and administered in person. Total 203 health care providers from 2 tertiary care hospital participated in the study .37. 4% (76) were from 25-34 years of age group and 31% (63) participants were from 15-24 years of age group. 51.24 % (104) were females and 48.76% (99) were males. 101 participants were cleaning and disinfecting touched objects when having a respiratory infection and covering nose and mouth while coughing and sneezing. Only 38.9% (79) underwent the awareness program.

Keywords: N-COVID 19, awareness program, preventive measures.

I. INTRODUCTION

he current Pandemic N-COVID-19 taking toll on health care providers worldwide as it is observed that mortality is more among health care providers. The health of health care providers is a major concern. As they have to take care of their health first to serve the humanity. It is observed that mortality among health care providers is more compared to common man. Therefore, it is necessary to study the knowledge, attitude and hygienic practices regarding N-COVID-19 among health care providers.

It is a small attempt to study the knowledge, attitude and practice to prevent N COVID-19 among health care providers themselves working in tertiary care hospitals of a Medical College. Let us hope, it is the beginning of research study of N-COVID- 19 Pandemic in tertiary care hospital. Such study is first of its kind in the said tertiary care hospital.

In 2019, an outbreak of the coronavirus began in Wuhan, China, affecting over 1,300 people, the largest recorded to date. The outbreak is ongoing as of February 2020.¹The 2019-nCoV infection caused clusters of severe respiratory illness similar to severe acute respiratory syndrome coronavirus and was associated with ICU admission and high mortality.²

The name "coronavirus" is derived from the Latin corona, meaning crown or halo, which refers to the characteristic appearance of the virus particles (virions): they have a fringe reminiscent of a crown or of a solar corona. Coronaviruses comprise the subfamily *Ortho coronavirinae* in the family Coronaviridae, in the order Nidovirales.^{3,4} They are enveloped viruses with a positive-sense single-stranded RNA genome and a nucleocapsid of helical symmetry.

a) Aim and Objectives

AIM - To find out the awareness regarding coronavirus among health workers working in tertiary care hospital Objective- To find out hygienic practices practiced by the participants.

D) MELIOUOIOGY	b)	Methodology
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Sr/No	Topic	Content
01	Setting	2 Tertiary Care Hospitals attached with the Medical College
02	Design	Cross sectional observational epidemiological study
03	Ethical consideration	Consent taken from the participants after explaining the purpose of study in their language
04	Sample size	100participants from one Tertiary Care Hospital and 103 from another Tertiary Care Hospital, total 203 participants

Author a: Associate Professor, Community Medicine, Terna Medical College & Hospital, Nerul, Maharashtra, India. e-mail: padmamddph@gmail.com

Author o: Professor, Pharmacology, NAMO Medical College & Research Centre, Silvassa, DNH & DD, India. e-mail: rksubodh@gmail.com

05	Study Period	February 2020
06	Analysis	The statistical analysis of data done with the help of Microsoft excel data sheet 2016 versionand SPSS package 25version
07	Inclusive criteria	1}Health care professionals working in Tertiary Care Hospitals 2}Health care professionals willing to give consent
07	Exclusive criteria	Health care professionals not willing to give consent

Results and discussions C)

A pre-structured proforma was prepared and got validated. Institutional Ethics Committee clearance was taken. Written consent of each participant was taken after explaining the purpose of the study in their language. Proforma was administered by the interns in person. Questions were asked to the participants from both the tertiary care hospitals. The data entered in Excel data sheet and analyzed using spss package.

The Epidemiological findings of the study are as follows:



Graph 1: Age wise distribution of the participants

Graph 1 shows the age wise distribution of the participants participated in the study. We found out that amongst the participants, maximum 37.4% (76) were from 25-34 years of age group and 31%(63) participants were from 15-24 years of age group.

In our study, 51.24% (104) were females and 48.76% (99) were males. 50.74% (103) participants were from one tertiary care hospital whereas 49.26% (100) were from other tertiary care hospital.



Pie chart 2: Types of Health Care Providers

In our study, the participants included 35% health care workers (Class IV) and 6% were Medical Doctors, 34% Nursing staff, 13% Interns, 12% other Students.

	Cover nose and mouth when coughing and sneezing			Chi Square Table	P-Value	Significant at 5% Level
Clean and Disinfect Touched Objects When Having Respiratory Infection	No	Yes	Total			
No	11	65	76	1.148	0.284	No
Yes	26	101	127			
Total	37	166	203			

Table 3: Hygienic practices practiced among health care providers

Regarding hygienic practices practiced among health care providers, we found out that 101 participants were cleaning and disinfecting touched objects when having a respiratory infection and covering nose and mouth while coughing and sneezing, though, this is not statistically insignificant, it is a good hygienic practice seen amongst health care providers. In a study conducted by Maria Cohut et al⁵ shows same results highlighting the practices of hygiene behavior in order to prevent spread of COVID-19. The Questionnaire was as follows:

eeks?

II. KNOWLEDGE ATTITUDE PRACTICE

Regarding N-COVID-19in tertiary care hospital among health workers

- 1. Do you clean your hands before and after attending patients with soap and water/alcohol-based hand rub? YES/NO
- 2. Do you wear mask when in contact with the patients? YES/NO
- 3. Do you seek early medical attention whenever you have fever, cough, breathlessness for more than two w YES/NO
- 4. Do you have any travel history from coronavirus infected areas? YES/NO S/NO
- 5. If you have respiratory infection then do you clean and disinfect touched objects and surfaces? YE
- 6. Do you have contact with person who has history of travel from coronavirus infected areas? YES/NO
- 7. Do you have history of close contact with a laboratory confirmed patient of corona virus ? YES/NO
- 8. Do you cover your nose and mouth when coughing and sneezing? YES/NO ke symptoms?
- 9. Do you take precautionary measures when any of your close contacts have cold or flu-li YES/NO
- 10. 1Do you eat thoroughly cooked meat and eggs? YES/NO
- 11. Do you avoid unprotected contact with pets and farm animals? YES/NO
- 12. 1Do you touch your eyes, nose and mouth with unwashed hands? YES/NO
- 13. Have you undergone any awareness program regarding coronavirus? YES/NO
- 14. Do you have an isolation ward for coronavirus patients in your hospital? YES/NO
- 15. Whether HCP attending the suspected coronavirus patient is routinely investigated? YES/NO
- 16. Have you posted signs/posters for spreading awareness of coronavirusat the entrance/OPD waiting areas/strategic places? YES/NO
- 17. Do you spread awareness about coronavirus in your respective residential society? YES/NO
- 18. Is it ensured that rapid triage and isolation of patients with symptoms of suspected coronavirus and other respiratory infection taken into consideration? YES/NO
- 19. Does the ambulance service notify your health care Center before transferring a suspected coronavirus patient? YES/NO
- 20. Does your hospital contain necessary investigation and treatment modalities for treatment of corona virus infection? YES/NO

Based on the Questionnaire, table is formed

Table 4: Knowledge attitude and practice regarding coronavirus among health care providers in tertiary care center

Question	Awareness				Total
	Yes	%	No	%	
Q1	203	100.0	0	0.0	203
Q2	175	86.2	28	13.8	203
Q3	173	85.2	30	14.8	203
Q4	0	0.0	203	100.0	203
Q5	127	62.6	76	37.4	203
Q6	0	0.0	203	100.0	203
Q7	0	0.0	203	100.0	203
Q8	166	81.8	37	18.2	203
Q9	171	84.2	32	15.8	203
Q10	153	75.4	50	24.6	203
Q11	134	66.0	69	34.0	203
Q12	81	39.9	122	60.1	203
Q13	79	38.9	124	61.1	203
Q14	61	30.0	142	70.0	203
Q15	82	40.4	121	59.6	203
Q16	89	43.8	114	56.2	203
Q17	149	73.4	54	26.6	203
Q18	129	63.5	74	36.5	203
Q19	107	52.7	96	47.3	203
Q20	80	39.4	123	60.6	203

In our study we found that,

- 86.2% (175) were wearing masks rather 13.8% (28) 1) were not wearing masks while in contact with patients.
- 85.2% (173) were seeking early medical attention 2) while having respiratory infection for more than two weeks while 14.8% (30) were not seeking early medical attention while having respiratory infection for more than two weeks.
- 62.6% (127) were cleaning and disinfecting touched 3) objects and surfaces while having respiratory infection while 37.4% (76) were not cleaning and disinfecting touched objects and surfaces while having respiratory infection.
- 81.8% (166) were covering their nose and mouth 4) while coughing and sneezing while 18.2% (37) were not covering their nose and mouth while coughing and sneezing.
- 84.2% (171) were taking precautionary measures 5) when their close contacts were having cold or flu like symptoms while 15.8% (32) were not taking precautionary measures when their close contacts were having cold or flu like symptoms.
- 75.4% (153) are eating thoroughly cooked meat and 6) eggs while 24.6% (50) are not eating thoroughly cooked meat and eggs.
- 66% (134) avoided unprotected contact with pet 7) and farm animals while 34% (69) were having unprotected contact with pet and farm animals.
- 39.9% (81) were touching their body parts with 8) unwashed hands while 60.1% (122) were not touching their body parts with unwashed hands.

- 9) 38.9% (79) have undergone awareness program regarding coronavirus while 61.1%(124) have not undergone awareness program regarding coronavirus.
- 10) 43.8% (89) have posted signs and posters regarding coronavirus and 56.2% (114) have not posted any signs and posters regarding coronavirus.
- 11) 73.4% (149) were spreading awareness regarding corona virus in their respective residential areas while 26.6% (54) were not spreading awareness regarding corona virus in their respective residential areas.

Conclusion III.

From our study, we conclude that majority of health care provider staff were using precautionary measures while dealing with COVID-19 patients. With only 38.9% (79) underwent the awareness program. If 100% of staff would undergo the training and awareness program, we are sure they will take better care of themselves and patients while on duty. The awareness program and training should be repeated periodically.

Conflict of Interest: Nil

Acknowledgement

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Although low-quality images are sufficient for review purposes, print publication requires high-quality images to prevent the final product being blurred or fuzzy. Submit (possibly by e-mail) EPS (line art) or TIFF (halftone/ photographs) files only. MS PowerPoint and Word Graphics are unsuitable for printed pictures. Avoid using pixel-oriented software. Scans (TIFF only) should have a resolution of at least 350 dpi (halftone) or 700 to 1100 dpi (line drawings). Please give the data for figures in black and white or submit a Color Work Agreement form. EPS files must be saved with fonts embedded (and with a TIFF preview, if possible).

For scanned images, the scanning resolution at final image size ought to be as follows to ensure good reproduction: line art: >650 dpi; halftones (including gel photographs): >350 dpi; figures containing both halftone and line images: >650 dpi.

Color charges: Authors are advised to pay the full cost for the reproduction of their color artwork. Hence, please note that if there is color artwork in your manuscript when it is accepted for publication, we would require you to complete and return a Color Work Agreement form before your paper can be published. Also, you can email your editor to remove the color fee after acceptance of the paper.

TIPS FOR WRITING A GOOD QUALITY MEDICAL RESEARCH PAPER

1. *Choosing the topic:* In most cases, the topic is selected by the interests of the author, but it can also be suggested by the guides. You can have several topics, and then judge which you are most comfortable with. This may be done by asking several questions of yourself, like "Will I be able to carry out a search in this area? Will I find all necessary resources to accomplish the search? Will I be able to find all information in this field area?" If the answer to this type of question is "yes," then you ought to choose that topic. In most cases, you may have to conduct surveys and visit several places. Also, you might have to do a lot of work to find all the rises and falls of the various data on that subject. Sometimes, detailed information plays a vital role, instead of short information. Evaluators are human: The first thing to remember is that evaluators are also human beings. They are not only meant for rejecting a paper. They are here to evaluate your paper. So present your best aspect.

2. *Think like evaluators:* If you are in confusion or getting demotivated because your paper may not be accepted by the evaluators, then think, and try to evaluate your paper like an evaluator. Try to understand what an evaluator wants in your research paper, and you will automatically have your answer. Make blueprints of paper: The outline is the plan or framework that will help you to arrange your thoughts. It will make your paper logical. But remember that all points of your outline must be related to the topic you have chosen.

3. Ask your guides: If you are having any difficulty with your research, then do not hesitate to share your difficulty with your guide (if you have one). They will surely help you out and resolve your doubts. If you can't clarify what exactly you require for your work, then ask your supervisor to help you with an alternative. He or she might also provide you with a list of essential readings.

4. Use of computer is recommended: As you are doing research in the field of medical research then this point is quite obvious. Use right software: Always use good quality software packages. If you are not capable of judging good software, then you can lose the quality of your paper unknowingly. There are various programs available to help you which you can get through the internet.

5. Use the internet for help: An excellent start for your paper is using Google. It is a wondrous search engine, where you can have your doubts resolved. You may also read some answers for the frequent question of how to write your research paper or find a model research paper. You can download books from the internet. If you have all the required books, place importance on reading, selecting, and analyzing the specified information. Then sketch out your research paper. Use big pictures: You may use encyclopedias like Wikipedia to get pictures with the best resolution. At Global Journals, you should strictly follow here.



6. Bookmarks are useful: When you read any book or magazine, you generally use bookmarks, right? It is a good habit which helps to not lose your continuity. You should always use bookmarks while searching on the internet also, which will make your search easier.

7. Revise what you wrote: When you write anything, always read it, summarize it, and then finalize it.

8. *Make every effort:* Make every effort to mention what you are going to write in your paper. That means always have a good start. Try to mention everything in the introduction—what is the need for a particular research paper. Polish your work with good writing skills and always give an evaluator what he wants. Make backups: When you are going to do any important thing like making a research paper, you should always have backup copies of it either on your computer or on paper. This protects you from losing any portion of your important data.

9. Produce good diagrams of your own: Always try to include good charts or diagrams in your paper to improve quality. Using several unnecessary diagrams will degrade the quality of your paper by creating a hodgepodge. So always try to include diagrams which were made by you to improve the readability of your paper. Use of direct quotes: When you do research relevant to literature, history, or current affairs, then use of quotes becomes essential, but if the study is relevant to science, use of quotes is not preferable.

10. Use proper verb tense: Use proper verb tenses in your paper. Use past tense to present those events that have happened. Use present tense to indicate events that are going on. Use future tense to indicate events that will happen in the future. Use of wrong tenses will confuse the evaluator. Avoid sentences that are incomplete.

11. Pick a good study spot: Always try to pick a spot for your research which is quiet. Not every spot is good for studying.

12. *Know what you know:* Always try to know what you know by making objectives, otherwise you will be confused and unable to achieve your target.

13. Use good grammar: Always use good grammar and words that will have a positive impact on the evaluator; use of good vocabulary does not mean using tough words which the evaluator has to find in a dictionary. Do not fragment sentences. Eliminate one-word sentences. Do not ever use a big word when a smaller one would suffice.

Verbs have to be in agreement with their subjects. In a research paper, do not start sentences with conjunctions or finish them with prepositions. When writing formally, it is advisable to never split an infinitive because someone will (wrongly) complain. Avoid clichés like a disease. Always shun irritating alliteration. Use language which is simple and straightforward. Put together a neat summary.

14. Arrangement of information: Each section of the main body should start with an opening sentence, and there should be a changeover at the end of the section. Give only valid and powerful arguments for your topic. You may also maintain your arguments with records.

15. Never start at the last minute: Always allow enough time for research work. Leaving everything to the last minute will degrade your paper and spoil your work.

16. *Multitasking in research is not good:* Doing several things at the same time is a bad habit in the case of research activity. Research is an area where everything has a particular time slot. Divide your research work into parts, and do a particular part in a particular time slot.

17. *Never copy others' work:* Never copy others' work and give it your name because if the evaluator has seen it anywhere, you will be in trouble. Take proper rest and food: No matter how many hours you spend on your research activity, if you are not taking care of your health, then all your efforts will have been in vain. For quality research, take proper rest and food.

18. Go to seminars: Attend seminars if the topic is relevant to your research area. Utilize all your resources.

19. *Refresh your mind after intervals:* Try to give your mind a rest by listening to soft music or sleeping in intervals. This will also improve your memory. Acquire colleagues: Always try to acquire colleagues. No matter how sharp you are, if you acquire colleagues, they can give you ideas which will be helpful to your research.

20. *Think technically:* Always think technically. If anything happens, search for its reasons, benefits, and demerits. Think and then print: When you go to print your paper, check that tables are not split, headings are not detached from their descriptions, and page sequence is maintained.

21. Adding unnecessary information: Do not add unnecessary information like "I have used MS Excel to draw graphs." Irrelevant and inappropriate material is superfluous. Foreign terminology and phrases are not apropos. One should never take a broad view. Analogy is like feathers on a snake. Use words properly, regardless of how others use them. Remove quotations. Puns are for kids, not grunt readers. Never oversimplify: When adding material to your research paper, never go for oversimplification; this will definitely irritate the evaluator. Be specific. Never use rhythmic redundancies. Contractions shouldn't be used in a research paper. Comparisons are as terrible as clichés. Give up ampersands, abbreviations, and so on. Remove commas that are not necessary. Parenthetical words should be between brackets or commas. Understatement is always the best way to put forward earth-shaking thoughts. Give a detailed literary review.

22. Report concluded results: Use concluded results. From raw data, filter the results, and then conclude your studies based on measurements and observations taken. An appropriate number of decimal places should be used. Parenthetical remarks are prohibited here. Proofread carefully at the final stage. At the end, give an outline to your arguments. Spot perspectives of further study of the subject. Justify your conclusion at the bottom sufficiently, which will probably include examples.

23. Upon conclusion: Once you have concluded your research, the next most important step is to present your findings. Presentation is extremely important as it is the definite medium though which your research is going to be in print for the rest of the crowd. Care should be taken to categorize your thoughts well and present them in a logical and neat manner. A good quality research paper format is essential because it serves to highlight your research paper and bring to light all necessary aspects of your research.

INFORMAL GUIDELINES OF RESEARCH PAPER WRITING

Key points to remember:

- Submit all work in its final form.
- Write your paper in the form which is presented in the guidelines using the template.
- Please note the criteria peer reviewers will use for grading the final paper.

Final points:

One purpose of organizing a research paper is to let people interpret your efforts selectively. The journal requires the following sections, submitted in the order listed, with each section starting on a new page:

The introduction: This will be compiled from reference matter and reflect the design processes or outline of basis that directed you to make a study. As you carry out the process of study, the method and process section will be constructed like that. The results segment will show related statistics in nearly sequential order and direct reviewers to similar intellectual paths throughout the data that you gathered to carry out your study.

The discussion section:

This will provide understanding of the data and projections as to the implications of the results. The use of good quality references throughout the paper will give the effort trustworthiness by representing an alertness to prior workings.

Writing a research paper is not an easy job, no matter how trouble-free the actual research or concept. Practice, excellent preparation, and controlled record-keeping are the only means to make straightforward progression.

General style:

Specific editorial column necessities for compliance of a manuscript will always take over from directions in these general guidelines.

To make a paper clear: Adhere to recommended page limits.



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Mistakes to avoid:

- Insertion of a title at the foot of a page with subsequent text on the next page.
- Separating a table, chart, or figure—confine each to a single page.
- Submitting a manuscript with pages out of sequence.
- In every section of your document, use standard writing style, including articles ("a" and "the").
- Keep paying attention to the topic of the paper.
- Use paragraphs to split each significant point (excluding the abstract).
- Align the primary line of each section.
- Present your points in sound order.
- Use present tense to report well-accepted matters.
- Use past tense to describe specific results.
- Do not use familiar wording; don't address the reviewer directly. Don't use slang or superlatives.
- Avoid use of extra pictures—include only those figures essential to presenting results.

Title page:

Choose a revealing title. It should be short and include the name(s) and address(es) of all authors. It should not have acronyms or abbreviations or exceed two printed lines.

Abstract: This summary should be two hundred words or less. It should clearly and briefly explain the key findings reported in the manuscript and must have precise statistics. It should not have acronyms or abbreviations. It should be logical in itself. Do not cite references at this point.

An abstract is a brief, distinct paragraph summary of finished work or work in development. In a minute or less, a reviewer can be taught the foundation behind the study, common approaches to the problem, relevant results, and significant conclusions or new questions.

Write your summary when your paper is completed because how can you write the summary of anything which is not yet written? Wealth of terminology is very essential in abstract. Use comprehensive sentences, and do not sacrifice readability for brevity; you can maintain it succinctly by phrasing sentences so that they provide more than a lone rationale. The author can at this moment go straight to shortening the outcome. Sum up the study with the subsequent elements in any summary. Try to limit the initial two items to no more than one line each.

Reason for writing the article—theory, overall issue, purpose.

- Fundamental goal.
- To-the-point depiction of the research.
- Consequences, including definite statistics—if the consequences are quantitative in nature, account for this; results of any numerical analysis should be reported. Significant conclusions or questions that emerge from the research.

Approach:

- Single section and succinct.
- An outline of the job done is always written in past tense.
- o Concentrate on shortening results—limit background information to a verdict or two.
- Exact spelling, clarity of sentences and phrases, and appropriate reporting of quantities (proper units, important statistics) are just as significant in an abstract as they are anywhere else.

Introduction:

The introduction should "introduce" the manuscript. The reviewer should be presented with sufficient background information to be capable of comprehending and calculating the purpose of your study without having to refer to other works. The basis for the study should be offered. Give the most important references, but avoid making a comprehensive appraisal of the topic. Describe the problem visibly. If the problem is not acknowledged in a logical, reasonable way, the reviewer will give no attention to your results. Speak in common terms about techniques used to explain the problem, if needed, but do not present any particulars about the protocols here.



The following approach can create a valuable beginning:

- Explain the value (significance) of the study.
- Defend the model—why did you employ this particular system or method? What is its compensation? Remark upon its appropriateness from an abstract point of view as well as pointing out sensible reasons for using it.
- Present a justification. State your particular theory(-ies) or aim(s), and describe the logic that led you to choose them.
- o Briefly explain the study's tentative purpose and how it meets the declared objectives.

Approach:

Use past tense except for when referring to recognized facts. After all, the manuscript will be submitted after the entire job is done. Sort out your thoughts; manufacture one key point for every section. If you make the four points listed above, you will need at least four paragraphs. Present surrounding information only when it is necessary to support a situation. The reviewer does not desire to read everything you know about a topic. Shape the theory specifically—do not take a broad view.

As always, give awareness to spelling, simplicity, and correctness of sentences and phrases.

Procedures (methods and materials):

This part is supposed to be the easiest to carve if you have good skills. A soundly written procedures segment allows a capable scientist to replicate your results. Present precise information about your supplies. The suppliers and clarity of reagents can be helpful bits of information. Present methods in sequential order, but linked methodologies can be grouped as a segment. Be concise when relating the protocols. Attempt to give the least amount of information that would permit another capable scientist to replicate your outcome, but be cautious that vital information is integrated. The use of subheadings is suggested and ought to be synchronized with the results section.

When a technique is used that has been well-described in another section, mention the specific item describing the way, but draw the basic principle while stating the situation. The purpose is to show all particular resources and broad procedures so that another person may use some or all of the methods in one more study or referee the scientific value of your work. It is not to be a step-by-step report of the whole thing you did, nor is a methods section a set of orders.

Materials:

Materials may be reported in part of a section or else they may be recognized along with your measures.

Methods:

- o Report the method and not the particulars of each process that engaged the same methodology.
- o Describe the method entirely.
- To be succinct, present methods under headings dedicated to specific dealings or groups of measures.
- Simplify—detail how procedures were completed, not how they were performed on a particular day.
- o If well-known procedures were used, account for the procedure by name, possibly with a reference, and that's all.

Approach:

It is embarrassing to use vigorous voice when documenting methods without using first person, which would focus the reviewer's interest on the researcher rather than the job. As a result, when writing up the methods, most authors use third person passive voice.

Use standard style in this and every other part of the paper—avoid familiar lists, and use full sentences.

What to keep away from:

- Resources and methods are not a set of information.
- o Skip all descriptive information and surroundings—save it for the argument.
- o Leave out information that is immaterial to a third party.



Results:

The principle of a results segment is to present and demonstrate your conclusion. Create this part as entirely objective details of the outcome, and save all understanding for the discussion.

The page length of this segment is set by the sum and types of data to be reported. Use statistics and tables, if suitable, to present consequences most efficiently.

You must clearly differentiate material which would usually be incorporated in a study editorial from any unprocessed data or additional appendix matter that would not be available. In fact, such matters should not be submitted at all except if requested by the instructor.

Content:

- o Sum up your conclusions in text and demonstrate them, if suitable, with figures and tables.
- o In the manuscript, explain each of your consequences, and point the reader to remarks that are most appropriate.
- Present a background, such as by describing the question that was addressed by creation of an exacting study.
- Explain results of control experiments and give remarks that are not accessible in a prescribed figure or table, if appropriate.
- Examine your data, then prepare the analyzed (transformed) data in the form of a figure (graph), table, or manuscript.

What to stay away from:

- o Do not discuss or infer your outcome, report surrounding information, or try to explain anything.
- Do not include raw data or intermediate calculations in a research manuscript.
- o Do not present similar data more than once.
- o A manuscript should complement any figures or tables, not duplicate information.
- Never confuse figures with tables—there is a difference.

Approach:

As always, use past tense when you submit your results, and put the whole thing in a reasonable order.

Put figures and tables, appropriately numbered, in order at the end of the report.

If you desire, you may place your figures and tables properly within the text of your results section.

Figures and tables:

If you put figures and tables at the end of some details, make certain that they are visibly distinguished from any attached appendix materials, such as raw facts. Whatever the position, each table must be titled, numbered one after the other, and include a heading. All figures and tables must be divided from the text.

Discussion:

The discussion is expected to be the trickiest segment to write. A lot of papers submitted to the journal are discarded based on problems with the discussion. There is no rule for how long an argument should be.

Position your understanding of the outcome visibly to lead the reviewer through your conclusions, and then finish the paper with a summing up of the implications of the study. The purpose here is to offer an understanding of your results and support all of your conclusions, using facts from your research and generally accepted information, if suitable. The implication of results should be fully described.

Infer your data in the conversation in suitable depth. This means that when you clarify an observable fact, you must explain mechanisms that may account for the observation. If your results vary from your prospect, make clear why that may have happened. If your results agree, then explain the theory that the proof supported. It is never suitable to just state that the data approved the prospect, and let it drop at that. Make a decision as to whether each premise is supported or discarded or if you cannot make a conclusion with assurance. Do not just dismiss a study or part of a study as "uncertain."

Research papers are not acknowledged if the work is imperfect. Draw what conclusions you can based upon the results that you have, and take care of the study as a finished work.

- You may propose future guidelines, such as how an experiment might be personalized to accomplish a new idea.
- Give details of all of your remarks as much as possible, focusing on mechanisms.
- Make a decision as to whether the tentative design sufficiently addressed the theory and whether or not it was correctly restricted. Try to present substitute explanations if they are sensible alternatives.
- One piece of research will not counter an overall question, so maintain the large picture in mind. Where do you go next? The best studies unlock new avenues of study. What questions remain?
- o Recommendations for detailed papers will offer supplementary suggestions.

Approach:

When you refer to information, differentiate data generated by your own studies from other available information. Present work done by specific persons (including you) in past tense.

Describe generally acknowledged facts and main beliefs in present tense.

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Topics	Grades		
	А-В	C-D	E-F
Abstract	Clear and concise with appropriate content, Correct format. 200 words or below	Unclear summary and no specific data, Incorrect form Above 200 words	No specific data with ambiguous information Above 250 words
Introduction	Containing all background details with clear goal and appropriate details, flow specification, no grammar and spelling mistake, well organized sentence and paragraph, reference cited	Unclear and confusing data, appropriate format, grammar and spelling errors with unorganized matter	Out of place depth and content, hazy format
Methods and Procedures	Clear and to the point with well arranged paragraph, precision and accuracy of facts and figures, well organized subheads	Difficult to comprehend with embarrassed text, too much explanation but completed	Incorrect and unorganized structure with hazy meaning
Result	Well organized, Clear and specific, Correct units with precision, correct data, well structuring of paragraph, no grammar and spelling mistake	Complete and embarrassed text, difficult to comprehend	Irregular format with wrong facts and figures
Discussion	Well organized, meaningful specification, sound conclusion, logical and concise explanation, highly structured paragraph reference cited	Wordy, unclear conclusion, spurious	Conclusion is not cited, unorganized, difficult to comprehend
References	Complete and correct format, well organized	Beside the point, Incomplete	Wrong format and structuring

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