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Mental State of Elderly Patients

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Highlights

A Correlational Model of Rape Myth

Ultrasound Diagnostics of Hip Dysplasia

Discovering Thoughts, Inventing Future

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A Correlational Model of Rape Myth Acceptance and Psychosocial Factors among Medical School Students

By Danilo Antonio Baltieri, Fatima Elisa D'Ippolito Alcocer & Luiz Carlos de Abreu

Abstract- A substantial body of medical literature suggests that different types of persons blame rape victim for the fate. Although rape myth acceptance can be a product of personal psychosocial factors, it is also a response to messages from social, family, media, and groups that propagate the legitimacy of such myths. We aimed to evaluate whether personal variables such as depression, drug use, being non-heteronormative, and inconsistent condom use could act as supportive factors for rape myth acceptance. This cross-sectional study used questions and validated instruments assessing sociodemographic characteristics, depression, drug use, and rape myth acceptance to perform a correlational model. A total of 269 medical students aged 18 and above, from the first through the sixth year at a medical school, were randomly selected and recruited for the study. Being male and using drugs significantly supported myth rape acceptance; in contrast, higher depression levels, being non-heteronormative, and a history of being sexually abused in childhood did not support these rape myths. What holds promise for the future, however, is that although we still live in a patriarchal society, university students can be encouraged to question their personal and sexual roles, and recreate our culture.

Keywords: *rape myth acceptance; biological sex; heteronormativity.*

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A Correlational Model of Rape Myth Acceptance and Psychosocial Factors among Medical School Students

Danilo Antonio Baltieri [α], Fatima Elisa D'Ippolito Alcocer [σ] & Luiz Carlos de Abreu [ρ]

Abstract- A substantial body of medical literature suggests that different types of persons blame rape victim for the fate. Although rape myth acceptance can be a product of personal psychosocial factors, it is also a response to messages from social, family, media, and groups that propagate the legitimacy of such myths. We aimed to evaluate whether personal variables such as depression, drug use, being non-heteronormative, and inconsistent condom use could act as supportive factors for rape myth acceptance. This cross-sectional study used questions and validated instruments assessing sociodemographic characteristics, depression, drug use, and rape myth acceptance to perform a correlational model. A total of 269 medical students aged 18 and above, from the first through the sixth year at a medical school, were randomly selected and recruited for the study. Being male and using drugs significantly supported myth rape acceptance; in contrast, higher depression levels, being non-heteronormative, and a history of being sexually abused in childhood did not support these rape myths. What holds promise for the future, however, is that although we still live in a patriarchal society, university students can be encouraged to question their personal and sexual roles, and recreate our culture.

Keywords: rape myth acceptance; biological sex; heteronormativity.

I. Introduction

A substantial body of literature shows that some persons can support beliefs that rape victims are responsible for their own fate. Stereotyped and prejudicial beliefs about rape and the victims and perpetrators can contribute to sexual violence by shifting blame for the assault from the perpetrator to the victim (Jain, 2011; Kamdar, Kosambiya, Chawada, Verma, & Kadia, 2017).Cultural, institutional, and personal aspects can further promote such equivocal judgment of the victims (Maddux & Yuki, 2006). Although rape myth acceptance can be a product of psychosocial aspects, it is also a response to messages from social, family, media, and groups that propagate the legitimacy of such myths. This study tests a correlational model involving some factors possibly related to rape myth acceptance. If an individual holds stereotypical or false beliefs about rape and the victims and perpetrators, he or she will likely have a negative attitude toward sexual assault survivors.

Although institutional, cultural, and individual aspects are specific fields of knowledge and research, it is not possible to disentangle one from another. For example, culture is the umbrella under which both social behaviors and individual beliefs exist. The world is full of unexploited psychological variations that offer a broad scope to develop and better test different theories (Henrich, 2015). In Brazil, for example, "*the cultural structure of the nature of the sexual realities and the interpretation of the meanings of the sexual practices have been based on the distinctions between masculinity and femininity, activity and passivity, domination and submission, and so on* (…). *These distinctive roles are gradually internalized through a complex process of socialization beginning in the earliest moments of childhood"*(Parker, 1991). Also, "*traditionally, men gain respect by performing the role of the 'macho', that is, those with a virile and brave status. Thus, a man should demonstrate his virility, measured by the number of sexual conquests*" (Hayes, 2011). It should be noted that we performed this study in a culture held up by a patriarchal structure, where there is socially demarcated roles of men and women, as well as learned beliefs. However, individuals may choose to act or think in ways that are contrary to the current cultural expectancies (Dressler, Balieiro, & Dos Santos, 1997).

Regarding rape myth acceptance, more men than women seem to blame the female victims for the assault (Basow & Minieri, 2011; Struckman-Johnson, 1992; Walfield, 2018); no study has suggested that women engage in such beliefs more frequently than men (Gravelin, Biernat, & Bucher, 2018). This is not surprising considering rape is mainly, if not exclusively, women's concern, and sexist cultural views still predominate in many different societies (Prado Cortez, Boer, & Baltieri, 2011; Stoll, Lilley, & Pinter, 2017). There are, however, studies that show that there were no significant differences between men and women about blaming the victim (Abrams, Viki, Masser, & Bohner, 2003; Persson, Dhingra, & Grogan, 2018). Sexism, mainly the hostile kind that comprises negative attitudes toward individuals who violate traditional gender

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stereotypes, seems to be a common denominator of rape myth acceptance (Chapleau, 2007) and can be associated with risky sexual behaviors (Glick, 1996). On the contrary, being non-heteronormative has been negatively correlated with rape myth acceptance (Worthen, 2017).

More women are victims of sexual assault than men (World Health Organization, 2003), and they experience a wide range of emotions such as shame, guilt, depression, and denial as a response to the traumatic event. Some victims even blame themselves for it, confusing their participation in the assault (McLindon, 2011). In a male-dominated society, women may accept the blame for their own victimization "*because they are the gatekeepers in sexual interactions*" (Bridges, 1991). Although it is possible that previous victimization and cultural expectations can influence women' beliefs, this assertion cannot be generalized (Carmody, 2001). Highly educated women may not condone these sexist statements. Some studies show a significant correlation between depression symptoms and rape myth acceptance among female victims (Arata, 1999; Feiring, Taska, & Chen, 2002). Other ones have shown a correlation between depression and justice sensitivity. In reality, in situations where a justice-sensitive individual is simply an observer, he or she tends to wish compensation for the victims and punishment for the perpetrators.

Higher rape myth acceptance scores seem to be a factor in risky sexual behaviors (Kalichman et al., 2005). Also, some studies have demonstrated that male aggression against women and inconsistent condom use may be related and that some men can use sexual tactics to ensure unprotected sex (Davis, 2010; Davis & Logan-Greene, 2012). Among men, high score on hostile sexism seems to be linked to lower condom use (Ramiro-Sanchez, Ramiro, Bermudez, & Buela-Casal, 2018). Individuals engaging in inconsistent condom use could be solely focusing on the reward of sex than the consequences of such conduct (Cortez, Boer, & Baltieri, 2011). Furthermore, issues of power, control over interaction with sexual partners, and the use of psychoactive substances are factors associated with pernicious sexual practices (Parsons, Bimbi, Koken, & Halkitis, 2005). Also, sensation-seeking, high impulsiveness, and risk-taking are linked to risky sexual practices (Kalichman, Heckman, & Kelly, 1996). Thus, inconsistent condom use can be an indicator of impulsiveness and transgression (Halkitis & Parsons, 2003).

Alcohol and drugs are common elements in rape cases, especially those that occur on university campuses (Abbey, 1996). Many studies have shown that intoxicated victims are blamed more often for the assault than those who were sober; in contrast, the drunker the perpetrator, the more excuses he gives for his behavior (Qi, 2016; Richardson, 1992).

Although it is crucial to investigate how different segments of the population endorse rape myths, university students comprise a relevant group because they are at high risk of facing sexual assault (Daigle, 2013).

Considering this, we hypothesized the following: being a heterosexual male, using drugs and inconsistent condom use can act as supportive factors for rape myth acceptance; in contrast, considering a sample of well-educated participants, a history of being sexually abused in childhood, depression scores, and being non-heteronormative do not.

II. Method

a) Procedure

We performed a cross-sectional study to investigate correlations between some psychosocial variables, mainly those potentially related to rape myths, such as biological sex, sexual orientation, drug use, and depression. The investigators were specially trained medical graduate and postgraduate medical students. The Ethics Committee of ABC Medical School, Santo André, São Paulo, Brazil approved this study.

b) Participants

Between September 2016 and August 2019, a total of 280 medical students aged 18 and above, from the first through the sixth year at the medical school, were randomly selected and recruited to participate in this study. The researchers assured participants that only the researchers would see the data, that all data would be kept confidential, and that the partaking was voluntary. Brazilian law does not allow financial compensation for participants of any researches.

Participant-important outcomes were compared based on 13 variables: biological sex, age, race, marital status, lifetime alcohol use, lifetime drug use (mainly marijuana), family members with alcohol/drug use problems, sexual abuse history, inconsistent condom use, sexual orientation, and scores of depression symptoms, drug use severity, and rape myth acceptance. We codified sex as male, female, and intersex. We did not codify monthly income as our participants were pursuing a full-time course.

c) Measures

The participants provided information through a self-reported questionnaire, which included items assessing sociodemographic characteristics and the following: the Beck Depression Inventory (BDI), Drug Abuse Screening Test (DAST), and Illinois Rape Myth Acceptance (IRMA).

The Beck Depression Inventory

This 21-item inventory measures behavioral responses related to depression among adults and adolescents. Scores above 10 (in the range 0–63) indicate the presence of a depressive syndrome (Beck,

Rial, & Rickels, 1974; Furlanetto, Mendlowicz, & Romildo Bueno, 2005). This test has a sensitivity of 100% and a specificity of 0.83 with a cut-off score of 9/10.

The Drug Abuse Screening Test

The DAST is a quantitative self-report instrument used to detect drug misuse among a range of psychoactive drugs. The original version contains 28 yes/no questions; a cutoff score of ≥ 6 (total score range 0–28) indicates a probable drug-use problem (Gavin, Ross, & Skinner, 1989). A cutoff score of 6 or 7 has a sensitivity of 0.96 and a specificity of 0.85. The DAST has been translated into Portuguese for administration to Brazilian adults (Baltieri & Andrade, 2008).

The Illinois Rape Myth Acceptance

Sgrillo Scarpati (2014) validated The Illinois Rape Myth Acceptance Scale – Short form (IRMA)(McMahon, 2011), an update of the 1999 version of the IRMA (Payne, 1999),in a sample of university students in Brazil. This instrument consists of 22-item scale that includes statements on a woman and man's role in a sexual situation that may lead to assault; it addresses women as the victims and men as the perpetrators. Participants indicate how much they agree with each statement on a 5 point scale from strongly agree to strongly disagree. Higher scores indicate more rejection of rape myths. This instrument has four factors: Factor 1 or "She asked for it" has statements such as "If a woman is raped while she is drunk, she is at least somewhat responsible for letting things get out of control" and "When women go around wearing low-cut or short skirts, they are just asking for trouble"; Factor 2 or "He did not have intention" has statements such as "When men rape, it is because of their strong desire for sex" and "Men did not usually intend to force sex on a woman, but sometimes they get too sexually carried away"; Factor 3 or "It was not really a rape" has statements such as "If a woman does not physically resist sex, it really cannot be considered rape" and "If the rapist does not have a weapon, you really cannot call it a rape"; and Factor 4 or "She lied" has statements such as: "Rape accusations are often used as a way of getting back at men" and "Women who are caught having an illicit affair sometimes claim that it was rape". The global internal consistency of this validated instrument was $\alpha = 0.72$, and the internal consistencies of the 4 factors were 0.74, 0.64, 0.68, and 0.71, respectively. The factor "He did not have intention" showed low internal consistency, which may mean a poor correlation between each item of this factor.

d) Analysis

Univariate analyses were used to compare the sociodemographic and psychometric factors between the male and female participants. Categorical variables were compared using the χ^2 or Fisher's exact tests, following the Monte Carlo method. Continuous variables were compared using student's *t*-test.

To develop a correlational model, we performed structured equation modeling (SEM). Maximum likelihood estimation was used to estimate the fit of the model. The Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), Goodness of Fit Index (GFI), Adjusted GFI (AGFI), Root Mean Square Error of Approximation (RMSEA), and Standardized Root Mean Square Residual (SRMR) were used to evaluate the model fit. Some recommendations regarding the values for global model fit were adopted — specifically, CFI, TLI, GFI, and AGFI values greater than 0.90, and RMSEA and SRMR values lower than 0.08 were deemed indicative of an acceptable model fit (Gilson et al., 2013; Hu & Bentler, 1999). As the chi-square value is dependent on the sample size, we calculated the ratio of chi-square relative to the degrees of freedom (χ^2/df), where a value of 2 or lower is an acceptable χ^2/df ratio (Tabachnick & Fidell, 2007).

III. Results

Of the returned questionnaires, 11 (3.93%) were discarded due to incomplete answers, leaving 269 participants. Of these, 175 (65.06%) were female, and the mean age of the total sample was 21.35 ($SD = 2.51$) years. Our sample did not have intersex or transgender participants.

The global internal consistency of the IRMA for this sample was $\alpha = 0.70$, and the internal consistencies of the 4 factors were 0.72, 0.62, 0.72, and 0.73, respectively. Again, Factor 2 (He did not have intention) show low internal consistency, which is in line with the validated version in Brazil.

Descriptive Analysis

In Table 1, we decided to compare the male and female participants in terms of sociodemographic and psychosocial factors because a large number of studies have shown higher rape myth acceptance among men than women. In fact, the male participants did show significantly higher rape myth acceptance for all factors than their counterparts. With respect to other variables, there were no significant differences between the male and female participants in terms of mean age, race, marital status, inconsistent condom use, lifetime alcohol use, lifetime drug use, family history of alcohol/drug use problems, being non-heteronormative, and DAST scores. However, female participants had higher BDI scores as well as prevalence of sexual abuse history.

Table 1: Socio-demographic and psychometric features between male and female university students

Variables	Male Students (n = 94)	Female Students (n = 175)	test	p
Age, mean (SD)	21.46 (2.16)	21.29 (2.67)	t = 0.54, 267df	0.59
Race, n (%)				
White	82 (87.23)	153 (87.43)		
Non-White	12 (12.77)	22 (12.57)	$\chi^2 < 0.01$, 1df	0.93
Marital status, n (%)				
Single	93 (98.94)	174 (99.43)		
Married/Common-law	1 (1.06)	1 (0.57)	$\chi^2 = 0.20$, 1df	> 0.99
Sexual abuse in childhood, n (%)	6 (6.38)	26 (14.86)	$\chi^2 = 4.19$, 1df	0.04*
Preservative use, n (%)				
Consistent use	62 (65.96)	109 (62.28)		
Inconsistent use	32 (34.04)	66 (37.72)	$\chi^2 = 0.36$, 1 df	0.55
Lifetime alcohol use, n (%)	83 (88.30)	161 (92.00)	$\chi^2 = 0.99$, 1df	0.32
Lifetime illicit drug use, n (%)	43 (45.74)	81 (46.29)	$\chi^2 < 0.01$, 1 df	> 0.99
Family members with alcohol/drug use problems, n (%)	53 (56.38)	100 (57.14)	$\chi^2 = 0.01$, 1df	0.90
Non-heteronormativity, n (%)	13 (13.83)	15 (8.57)	$\chi^2 = 1.81$, 1df	0.18
BDI, mean (SD)	8.11 (8.54)	10.42 (7.35)	t = -2.32, 267df	0.02*
DAST, mean (SD)	4.72 (3.69)	5.18 (3.81)	t = -0.94, 267df	0.35
IRMA, mean (SD)				
Factor 1	27.87 (2.49)	29.05 (1.70)	t = -4.21, 267df	< 0.01**
Factor 2	27.18 (3.86)	28.14 (2.69)	t =- 2.38, 267df	0.02*
Factor 3	24.31 (1.43)	25.75 (0.71)	t = -3.28, 267df	< 0.01**
Factor 4	22.02 (3.75)	23.81 (2.11)	t = -4.99, 267df	< 0.01**

Note: BDI, Beck Depression Inventory; DAST, Drug Abuse Screening Test; IRMA, Illinois Rape Myth Acceptance; * $p < 0.05$; ** $p < 0.01$

Given that the variable "male" was strongly associated with all factors of the IRMA, and that there were significant differences between the male and female participants in two other variables, we decided not to include it in the SEM to avoid weakening the influence of the hypothesized variables on rape myth acceptance.

SEM Analysis

Items were loaded uniquely on their relevant factors, and the factor loadings were fixed at 1.0. Then, the sample was evaluated using bootstrapping (400 bootstrap samples) with the Bollen-Stine Bootstrap statistic being conducted to verify absolute fit. As it is shown in Figure 1, the model fitted the data well, with

χ^2/df= 1.88, CFI = 0.98, TLI = 0.90, GFI = 0.99, AGFI = 0.93, RMSEA = 0.05 [95% CI = 0.010–0.108], SRMR = 0.02 and a Bollen-Stine statistic of p = 0.12.

Furthermore, as Figure 1 shows, where the statistically significant correlations are visualized, only higher DAST scores supported rape myth acceptance; sexual abuse history, being non-heteronormative, and higher depression scores did not. Inconsistent condom use did not correlate with rape myth acceptance but positively correlated with sexual abuse history. Factor 2 (He did not have intention) did not correlate with any variables included in SEM; therefore, it was visually suppressed with the aim of making the figure cleaner.

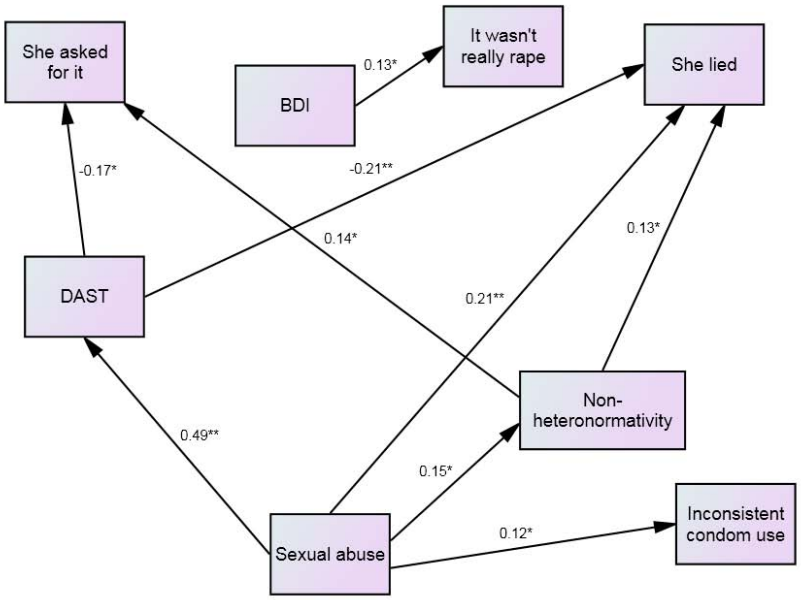

Figure 1: A correlational model between myth rape acceptance-related factors and psychosocial aspects

IV. Discussion

This study supports previous research that being male and using drugs are supportive factors for blaming the victim, while being non-heteronormative is not. However, holding up our initial hypotheses but somewhat disagreeing with other studies, depression levels and sexual abuse history did not support rape myth acceptance.

Although comparisons between the male and female participants in terms of depression symptoms and sexual abuse history were not the main goal of this study, the higher mean scores on depression in women than in men, mainly among young people (Albert, 2015; Cyranowski, Frank, Young, & Shear, 2000; Ford & Erlinger, 2004), and higher prevalence of sexual abuse history in women (World Health Organization, 2003) have already been widely demonstrated.

Each factor of the IRMA assesses a group of myths that function to neutralize the perpetrator's responsibility. However, the Factor "It wasn't really rape" does not properly include a victim-blaming or responsibility-denying component (Mouilso, 2013); it seems to be a subtle construct of victim-blaming. This factor simply presumes that a woman consented to a sexual relationship because she did not display any kind of a physical reaction against the act, neither presumably "instigated" male sexual instincts. Participants with higher depression scores could have perceived this and reacted more strongly. In fact, some studies have shown that depressive individuals seem to react more intensely to injustice and threats of rejection (Schmitt, 2005). In addition, having a low threshold for injustice can make sensitive individuals recognize more cases of it than those who are insensitive.

The myths transferring responsibility onto the victims (Factors 1 and 4) positively correlated with higher drug use scores but negatively with being non-heteronormative. Youth substance users can attribute their own responsibilities to others. More recently, the perception of drug users as rational pleasure-seekers has legitimated management focused on individual responsibility; it has been important to transform young people into self-reflexive and responsible citizens (Ekendahl, 2020). Several people believe that intoxicated men can misinterpret different behaviors, including women's. Despite these beliefs, our study suggests that even sober drug users can maintain these misconceptions. Drug users may demonstrate interpersonal problems and impaired or distorted perceptions of emotions in others. In fact, deficits in social processing can persist even after long periods of abstinence (Kornreich et al., 2001; Miller, Bershad, & de Wit, 2015; Preller et al., 2014).

Studies have also suggested that non-heteronormative individuals are less likely to support

rape myths than heterosexual men and women (Worthen, 2017); reasons presented to explain this finding include the former being raped more frequently (Balsam, Rothblum, & Beauchaine, 2005), being less sexist, adhering less to patriarchal gender norms, and supporting feministic ideas more commonly than the latter. However, not all non-heteronormative individuals abandon patriarchal and cultural norms. For example, lesbians can have a certain animosity toward heterosexual women and support rape myths (Brewster, 2010); this can also be true to some extent vis-à-vis bisexuals and transsexuals.

Although individuals who have suffered sexual abuse can feel confused about their role in the assault, recent social movements, such as *#Me Too*, have emphasized the need to raise awareness about the prevalence and harms of such acts; survivors have started rejecting more strongly the societal norms that previously demanded their silence or even acceptance (AcAdam, 1999). This system of false beliefs regarding victim-blaming where "*victims have been denigrated for their role in the rape, even to the extent whereby the victim is held responsible for the assault*" (Grubb, 2012; Tyson, 2019) has been vehemently challenged. Thus, the survivors have manifested their desire to give voice to their injuries. Therefore, it is important to listen to the victims because "they did not lie".

As the results show, inconsistent condom use did not correlate with any factors of the IRMA but did with sexual abuse history. Sexual or physical abuse during childhood (Hamburger et al., 2004), use of psychoactive drugs, and personality-related factors (such as reward dependence) have been associated with the inconsistent condom use (Cortez et al., 2011). Different researchers have already correlated unprotected sexual practices with search for higher physical stimulation, attempts to cope with emotional fatigue and stress, a chaotic lifestyle, and alcohol and drug abuse (Kalichman et al., 1996; Kelly, Bimbi, Izienicki, & Parsons, 2009).

Moreover, with the exception of being male, no other variable tested was correlated with the factor "He did not have intention". It is possible that the factor's low internal consistency in our sample affected its significant correlation with other variables. Nonetheless, this factor assumes that men have a great need for sex due to a presumable higher sexual impulsivity. We also believe that in a group of medical students who have the privilege of maintaining contact with different individuals on a university campus as well as with patients belonging to diverse cultural and social backgrounds, a reduction in prejudice and misunderstandings is possible and extremely positive (Taschler, 2017).

Rape myths are still supported mainly by men and drug users. What, however, can be considered as positive is that some variables that previously correlated with these myths, such as depression and sexual abuse history, did not in our study. Although we still live in a patriarchal society, university students can be encouraging to question their personal and sexual roles, and recreate our culture. To cultivate an inclusive and unbiased environment, it is important that no victim be pressured into taking responsibility for a sexual assault and reducing the blame on the perpetrator. Women combating sexual stereotypes represent freedom and dignity, which are important in a fair society.

This study has several limitations that must be listed:

a) The path model limits the interpretation of the results; although it shows directionality of the relationships, it is unable to establish causality between the variables
b) Some individual (personal) variables are not evaluated in the correlational model, such as sex and race
c) This study does not take into account institutional and situational factors possibly related to the rape myth acceptance (Gravelin et al., 2018);
d) The IRMA entails a general tendency toward victim-blaming, which may have affected the reliability of the findings (Dawtry, Cozzolino, & Callan, 2019)
e) An evaluation of social desirability is suitable to increase the reliability of these findings.

Compliance with Ethical Standards

Potential conflicts of interest: None. Authors have not received any grants.

Ethical Approval: All procedures performed in the participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. This study was approved by the Ethics Committee of the ABC Medical School.

Informed Consent: All participants signed a consent form to partake in this study.

Constraints on publishing: There are no any constraints.

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Influence of Integration of Psychosomatic Concept on the Mental State of Elderly Patients in Emergency Ward

By Huijun Qi, Zhangshun Shen, Hui Guo, Qian Zhao & Jianguo Li

Abstract- *Objective:* To explore the influence of the diagnosis and treatment mode based on thepsychological concept for the mental state of elderly patients in emergency ward.

Method: From January to March 2019,105 elderly patients in ward were selected as control group and given routine treatment mode;98 elderly patients as observation group, and the concept of psychosomatic medicine the was integrated intodiagnosis and treatment.The scores of SRQ, SAS, SDS and TCSQ at admission and discharge were compared between the two groups.The questionnaire survey of patients or family members at discharge were compared.

Results: Compared with the control group, at discharge the score of SRQ,SAS,SDS in the observation group were lower($P<0.05$); the score of positive coping of TCSQwas higher than that in control group ($P<0.01$), and the score of negative coping was lower than that in control group ($P<0.01$). The family questionnaire at discharge showed attitudes, technical level, medication and satisfaction of the whole department in the observation group were higher than those in the control group. $P<0.05$).

Keywords: *psychosomatic medicine; emergency ward; elderly patients; mental state.*

GJMR-K Classification: *NLMC Code: WM 90*

Strictly as per the compliance and regulations of:

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Conclusions: The model of diagnosis and treatment based on the concept of psychosomatic medicine can alleviate the psychological stress and bad mood of elderly patients in emergency ward, enable patients to respond positively to the disease and improve patient satisfaction.

Keywords: psychosomatic medicine; emergency ward; elderly patients; mental state.

Introduction

Psychosomatic medicine is an interdisciplinary subject that studies processes of physical, psychological and social interaction and their relevance to health and disease[1]. It makes up for the deficiency of biomedical model, helps to improve the treatment result and quality of life of patients, and provides more possibilities for the diagnosis and treatment of difficult medical problems.[2] As many countries are stepping into old age society, it is gradually recognized that elderly patients, like pediatric patients, have unique characteristics of diagnosis and treatment. The physical and mental of them are more fragile and sensitive than other patients, and they are more prone to fear, loneliness and helplessness. This psychological change may have an impact on the results of treatment and prognosis [3-4]. In recent years, the number of elderly patients admitted to emergency wards is increasing. they had higher negative psychological response. Many of them had anxiety, depression, Anxiety. Depression was one of the important factors affecting the prognosis of patients. How to apply psychosomatic medicine to emergency elderly patients was important social significance. Based on the routine diagnosis and treatment, this study combined coping skills, stress management and health education with the idea of psychosomatic medicine. And it's designed to relieve the emotional [5], And 98 elderly patients in emergency ward from April to June 2019 were prospectively observed and satisfactory results were obtained.

I. Materials and Methods

a) Clinical data

From January to March 2019,105 elderly patients were selected as control groupFrom April to June 2019,98 elderly patients were selected as the observation group. Inclusion criteria :(1) age >65 years; (2) Be conscious, Cognitive judgment and literacy skills, good communication;(3). Length of stay >3 d; (4)Exclusion of patients with malignant tumors, infectious diseases and major organ failure, All patients and their families signed informed consent.

Exclusion criteria: (1) had a history of mental illness, severe mental illness; (2)Termination or transfer of treatment; (3)Systematic psychological intervention; (4)Patients who refused to participate in the study. Comparison of general clinical data between the two groups was not statistically significant ($P>0.05$) (see Table 1).

b) Methods

i. *Control group:* Using routine diagnosis and treatment process, medical staff regular rounds. Chief physician, deputy chief physician round 1-2 times a week, focus on the review of critical patients diagnosis and treatment plan, guide the handling of difficult cases, decide on major surgery or special examination and treatment, spot check the quality of

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medical care. The attending physicians conduct a round of rounds once a day to conduct a comprehensive tour of the patients under management, discuss the handling of critical and difficult cases and newly admitted patients, decide to consult, discharge or transfer, collect the patient's opinions, improve the work, and close the doctor-patient relationship. Residents should check twice a day and in the afternoon. Critical and unstable patients should be observed and treated at any time. Residents should also timely check the test results and special reports, analyze the condition, and report to the superior doctors in time.

The chief resident or night shift doctor shall patrol at night before the night shift. Monitor vital signs and explain the concerns of patients and their families, such as the necessity and safety of medical operation and treatment, guidance of medication, observation of adverse reactions, etc; give oral comfort to patients with bad mood to stabilize their emotions.

ii. *Observation group:* On the basis of routine diagnosis and treatment, the new mode is adopted with the concept of psychosomatic medicine. The contents are as follows :

(1) Two comprehensive for doctor in charge: ①They should fully understand the patient from head to toe to find problems and solve them,consult a specialistin timeif necessary; ①They should have a comprehensive understanding from the nine aspects of "Clothing, food, shelter, transportation, sleep, psychology, family, environment and society" to collect patient information.The doctor in charge should understand the medical reimbursement systemto help the patients, and check the rational use of medicines, reduce the economic burdenof the family, and eliminate the worries of the family members.

(2) Cross-location of patients: The patients whom the same doctorin charge of are arranged in different rooms. When she/he visit her/his patients, Patients whom other doctorsare responsible for can also be visited and comforted, This way can increasethe frequency of contact and communication between doctors and patients and their families,and it will also increase the overall the ward care atmosphere for patients.

(3) Fixed frequency of communication: Rounds 5 times a day, Fixed time: come to work morning, noon off, come to workafternoon, afternoon off,night at 21:00 (chief resident or night shift doctor). Oral conversation, Concerned about the feelings of patients and their families, recordedin writing at any time the opinions and demands of patients and their families ,To enhance the trust and dependence of patients and their families on medical staff. [6]

(4) Mutual communication among patients: Encourage mutual understanding and communication among patients, to form a atmosphere of understanding, help and support.

(5) Psychological support: The elderly patients in the ward are sensitive and fragile, and the emotional anxiety affects the disease. Doctors are required to often encourage patients and family members to increase their confidence in treatment, help them to regulate the emotional, cultivate positive psychological to block the bad psychological factors[7].

c) Clinical Data Collection

(1) Psychological stress response: the psychological stress response questionnaire (SRQ) [8] was used to investigate,and after entering the stable condition (at admission) and leaving the ward (at discharge). The questionnaire included 3 dimensions, 28 entries, The three dimensions were somatic, emotional and behavioral responses, A negative score of 1～5 for each entry. The higher the score, the more severe the response is. The internal consistency coefficient of the questionnaire is 0.910.

(2) Mental state: The anxiety and depression were investigated by self-rating anxiety scale (SAS) and self-rating depression scale (SDS) at admission and discharge. SAS、SDS the scale contains 20 entries each, Grade 4 for each entry, SAS score ≥50 for anxiety, SDS score ≥53 with depression[9].

(3) The hospital satisfaction was investigated by patients and their family at discharge.The questionnairescale is same one for all the hospital.

d) Statistical Analysis

SPSS 23.0 software was used for statistical analysis. The measurement data consistent with normal distribution were represented by $\bar{x} \pm s$, and the comparison between groups was performed by independent sample T test. The count data were expressed by percentage, and the comparison between groups was performed by χ^2 test. Bilateral test was used, and $P<0.05$ indicated statistically significant differences.

II. Results

a) Comparison of baseline data between the observation group and the control groupgroups (Table 1)

There was no significant difference between the *Observation* and the *Control* group (P>0.05) in general

information such asgender, age, Marital status, Level of education, Medical Payment Method.

b) Comparison of SRQ scores in groups

There was no difference between groups at admission in the scores of emotional response, somatic response and behavioral response. and which were lower in the observation group at discharge than those in the control group (P<0.05)(Table 2).

c) Comparison of SAS、SDS scores in groups.

There was no difference between groups at admission in the SAS、SDS score, which of the observation group was lower than that of the control group at discharge (P<0.05)(Table 3);

d) Comparison of TCSQ scores in groups

There was no difference between groups at admission in the scores of positive and negative responses coping in the TCSQ and the scores of positive responses were higher in the observation group than those in the control group at discharge ,the scores of negative responses is opposite, there was difference between groups (P<0.01) (Table 4)

e) The questionnaire survey at discharge showed that 97 valid of 98 were distributed in the observation group. The control group received 104 valid questionnaires (total 105). The satisfaction of the observation group with the attitude, technical level, medication and the whole department were higher than that of the control group (P<0.05) (see Table 5).

III. Discussion

The proportion of elderly people in the world is increasing day by day, whose physiological tissue structure and functional structure began to appear degenerative changes, and the function of respiration, circulation, digestion, endocrine and other systems was declined with the growth of age in elderly people, resulting in the phenomenon of weak and sick. Due to the weakness of the body, the decline of brain function, and the change of social status of the elderly, self-regulation imbalance, various negative emotions such as loneliness, depression, emptiness, nostalgia, anxiety and so on gradually become the dominant emotions in old age [3-4]. The incidence of depression and autism in the elderly has increased year by year, and studies have reported that among the elderly patients with physical health problems, accompanying mental problems has become an important factor that affeced diagnosis, treatment and prognosis [10] .More than 30% of elderly patients with somatic diseases develop mental disorders associated with it. Among the elderly in Chongqing China, the detection rate of depression and anxiety was 57.2% and 40.8%;, the proportion of subjective well-being was 43.8%, which was at a lower level; loneliness was at a higher level, the proportion was 17.9%[11]. We can also see this situation in this study. As a special group, their psychological problems should be paid more and more attention. How to provide better living conditions for the elderly to make their later life happy has attracted increasing attention.

Also, the number of elderly patients admitted to emergency wards is increasing, often with pessimistic, disappointed, anxious, fear and other emotional, this bad experience can easily affect the compliance of treatment and treatment effect. In the control group of this study, in the previous routine diagnosis and treatment mode, we paid attention to the observation of the patient's condition, and paid less attention to the psychological aspect. Although some personnel had carried out psychological care to elderly patients, but because of the single method, it cannot solve the problems encountered by patients, and it is easy to appear different degrees of stress (see table 2, table3, Table4).

The model of diagnosis and treatment, which is integrated with the concept of psychosomatic medicine, has been widely used in clinic in recent years. It has been reported that the this mode which integrates the concept of psychosomatic medicine can effectively alleviate the negative emotion of patients [12-13]. Psychological stress refers to the process of adaptation that people show through the whole psychological and physiological response after understanding and evaluating harmful, threatening and challenging to the outside world. Research reports, the patients in the emergency ward had a better physical response than the inpatients, and the ability to adopt coping behavior strategies is weak [14]. In this study, the elderly admitted in the emergency ward as the research object, They were paid more attention from head to toe,and to find problems and solve them,consult a specialistin timeif necessary,and to collect patient informationfrom the nine aspects of "Clothing, food, shelter, transportation, sleep, psychology, family, environment and society". In this way, their anxiety were relieved and worries solved from various aspects. In the other hand, a series of measures based on the concept of psychosomatic medicine: cross placement of patients, fixed frequency of communication, encouraging communication between patients, as well as the individualized psychological program, had been taken, and good results had been achieved,which reduced the psychological stress response caused by illness and hospitalization.The scores of emotional response, somatic response and behavioral response of SRQ at dischargein the observation group were lower than those in the control group (P<0.05)(Table 2) and the SAS/SDS score was lower than that of the control groupat discharge (Table 3).

It is very important to encourage communication, including the use of therapeutic

communication and intervention among patients, medical staff and patients, patients and their families, so that elderly patients can accept the lonely time and regulate their bad emotions through their own behaviors [15].The diagnosis and treatment mode of psychosomatic medicine needs to pay attention to the role of social support factors in patients' psychological problems. Residents should do a good job in ideological work of family members, encourage patients in ward to communicate with each other, and establish a harmonious and friendly atmosphere, which has positive significance for relieving patients' negative emotions, and has a certain significance for their own disease treatment and prognosis [16]. In this study, score of TCSQD showed a higher positive response in the observation group at discharge than in the control group, patients were more positive in the face of disease than the control group ($P<0.05$) (table4). In addition, Implementation of the responsibility system, Which inspired a doctor's sense of responsibility, can better take patient needs as a starting point, provide better service for patients. It ensured the quality of the diagnosis and treatment mode integrated with the concept of psychosomatic medicine. Family members and patients discharged from hospital questionnaire survey showed that the observation group not only had a higher degree of satisfaction with doctor's attitude and the whole department ($P<0.05$), but also had a higher degree of satisfaction with the doctor's technical level than the control group ($P<0.05$) (table5). In fact, doctors were the same in two groups, result aboved showed that a good doctor-patient relationship could obtain the trust of patients' families and get better treatment feelings.

Health problem is the core for the elderly life. Many elderly patients have anxiety, depression mood, It is not only one of the important reasons affecting the prognosis of patients, but also one of the factors leading to doctor-patient contradictions. The application of psychosomatic medicine to emergency elderly patients makes up for the deficiency of biomedical model, has important social significance, or is conducive to improving the current tense doctor-patient relationship.

Conflict of interest: no conflict of interest for all authors

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Table 1: Comparison of General Data

Project	Observation Group98 Example)	Control group105 Example	*P*Value
Gender (male/female)	54/44	57/48	*P >0.05*
Age (x±s)	70..53±16.23	70.10±15.93	*P >0.05*
Marital status (married/widowed)	88/10	94 /11	*P >0.05*
Level of education (primary/ secondary/secondary/university)	45/21/14/18	48/22/16/19	*P >0.05*
Medical Payment Method Medical insurance/NRCMS/Fund	60/24/14	64/28/13	*P >0.05*

Table 2: Groups before and after intervention SRQ Score comparison score(x ±s)

Group n	Emotional response		Somatic response		Behavioral response	
	Admission	Discharge	Admission	Discharge	Admission	Discharge
Observation Group (n=98)	21.53±9.12	16.24±6.12	19.43±7.78	14.32±5.14	10.56±4.78	6.21±3.25
Control group (n=105)	21.28±8.75	18.66±6.83	1972±6.87	16.91±5.38	10.43±4.92	8.02±3.46
*t*Value	0.132	1.770	0.187	2.335	0.127	2.558
*P*Value	0.447	0.040	0.426	0.011	0.450	0.006

Table 3: Comparison of SAS and SDS scores in 2 groups (x±s,)

Group n	SAS Score		SDS Score	
	Admission	Discharge	Admission	Discharge
Observation Group (n=98)	42.67±7.82	33.86±5.28	42.32±6.61	36.28±6.17
Control group (n=105)	41.93±5. 64	36.12±5.69	43.05±7.32	39.42±7.35
*t*Value	0.181	1.953	0.497	2.195
*P*Value	0.428	0.027	0.310	0.015

Table 4: Comparison of TCSQ scores between the two groups before and after intervention (score)

Group n	Positive response		Negative responses	
	Admission	Discharge	Admission	Discharge
Observation Group (n=98)	29.24±7.82	37.76±58	32.32±7.62	24.88±4.57
Control group (n=105)	30.10±7..64	33.86±7.64	32.65±7.32	30.42±4.85
T Value	0.160	2.765	0.499	5.620
P Value	0.450	0.003	0.310	0.000

Table 5: Results of Patient and Family Discharge Questionnaire [%(M)]

Satisfaction survey content	Observation Group (n=97)			Control group (n=104)			Satisfaction comparison	
	Satisfaction	General	Not satisfied	Satisfaction	General	Not satisfied	χ^2 Value	*P values*
Attitude towards the bed doctor	100 (97)	0(0)	0(0)	93.27(97)	3.85(4)	2.88(3)	6.076	0.030
Technical level of the tube bed doctor	98.96(96)	1.04(1)	0(0)	91.35(95)	6.73(7)	1.92(2)	5.795	0.037
Medication to the bed	100 (97)	0(0)	0(0)	92.31(96)	5.77(6)	1.92(2)	7.467	0.015
For the entire department	98.96(96)	1.04(1)	0(0)	91.35(95)	5.77(6)	2.88(3)	5.789	0.041

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Ultrasound Diagnostics of Hip Dysplasia in Infants

By Nozima Solieva & Umida Rustamova

Abstract- We examined 60 children aged three weeks to 8 months of life, who were referred for consultation with an orthopedist by local pediatricians with suspected hip dysplasia. Traditionally, the clinical examination of the child has been given great importance. We concluded that the use of a new method of ultrasonographic diagnostics in children in infancy allows us to identify dysplasia of the hip joint at the very early stages of development and to accurately determine its forms and stages.

Keywords: *ultrasound diagnostics, hip, hip dysplasia, infants.*

GJMR-K Classification: *NLMC Code: WN 180*

Ultrasound Diagnostics of Hip Dysplasia in Infants

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Keywords: ultrasound diagnostics, hip, hip dysplasia, infants.

I. The Relevance of Research

Hip dysplasia (TPD) is one of the most common pathologies. Currently, the incidence of hip dysplasia is 6–20 cases per 1000 newborns; unfortunately, a tendency to increase the frequency of this disease is noted in ecologically unfavorable areas. The traditional diagnostic method remains X-ray, recording changes only in bone structures, the number of which in children in the first months of life is relatively small. According to various domestic and foreign authors, X-ray examination of the hip joints becomes informative at the age of no earlier than 3-5 months of life. The most important task of modern pediatric orthopedics is the early detection of children with congenital hip dislocation (VVB) and congenital dysplasia. It was found that the percentage of positive treatment results at an early age is inversely proportional to age [1, 2]. In 97% of children, it is possible to get good and excellent results if this pathology is detected before the age of 3 months and the early start of its treatment. In 82% of cases, you can achieve similar results if you start treatment after 3 and up to 6 months of life in children, and only in 30% of cases the results will be only good if treatment is started in the second half of life [3, 4, 5].

II. Objective

To determine the significance of early ultrasonographic diagnosis of hip dysplasia in infants.

III. Material and Research Methods

We examined 60 children aged 3 weeks to 8 months of life, who were referred for consultation with an orthopedist by local pediatricians with suspected hip dysplasia. Based on the ultrasound diagnostics department, we studied the hip joints of children of the first year of life when using ultrasound scanners equipped with linear scanning sensors with an operating frequency of 5-7.5 MHz.

The ultrasound technique and the ultrasound classification of the types of the structure of the hip joints were first developed by the Austrian doctor Graf R. (1989) and are currently supplemented and expanded by several domestic and foreign authors. The hip joint is formed by the acetabulum and the femoral head. The articular lip (labrum acetabular), which is often called the limbus, is attached around the circumference of the acetabulum (formed by the iliac, sciatic, and pubic bones, interconnected by an u-shaped cartilage). All these anatomical structures have a clear echographic image during on ultrasound examination. At the age of 1.5–6 months, nuclei of ossification of the femoral head are formed. As a rule, the ossification center is formed centrally, but it is possible to shift laterally or medially from the center of the head. Also, the process of ossification of the heads can be asymmetric. These changes, in the absence of other deviations, are not a sign of dysplasia and can be regarded as a normal option for the development of hip joints.

IV. Results and Discussions

According to the literature, early detection of congenital hip dislocation and congenital dysplasia remains at a low level of 30–40% when using the old system of organizational and therapeutic measures (x-ray and clinical examination of children under six months of age). But, due to the poverty of clinical symptoms, the diagnosis of this pathology can be very difficult at such an early age, but, despite this, this study should be carried out in the first days of a child's life, the purpose of which is to identify hip dysplasia [6. 7]. Until recently, the main method for diagnosing the pathology of the hip joint was radiography (RG). However, due to radiation exposure and the impossibility of visualizing the proximal end of the femur and the roof of the acetabulum, as well as identifying deviations in their structure due to the predominance of cartilage, its use is not practical up to 3 months of age. Ultrasonography (USG) is a relatively new alternative method that allows you to expand the diagnostic capabilities to assess the state of development of the hip joints in newborns and

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children in the first months of life [8, 9]. Using this diagnostic method makes it possible to visualize the soft tissue components of the hip joint. Non-invasiveness, the absence of special training, the absence of contraindications and complications, the possibility of repeated and regular use, the absence of radiation exposure, the speed of execution, mass screening, and most importantly, the optimal age range of the examined from 0 to 10 months, all these are indisputable advantages of this method.

Based on the results obtained, it should be noted that in clinical practice there is an over diagnosis of dysplasia. When clinical symptoms of hip dysplasia are identified, the diagnosis is confirmed with ultrasound in only 47% of cases. Thus, the use of ultrasound can clarify or completely exclude the alleged orthopedic pathology, which often saves the child from unnecessary treatment. With the modern development of diagnostic equipment, ultrasound of the hip joints seems to be an advantageous alternative to x-ray diagnostics of the pathology of the hip joints in newborns, as it allows us to evaluate the cartilage structures that mainly represent the child's joint in the first months of life, as well as muscle and connective tissue components, while avoiding unjustified radiation exposure [9, 10, 11]. In addition to these obvious advantages, ultrasound allows you to conduct functional tests in real-time (bringing the thigh to the stomach with simultaneous rotation of the inside, tests according to the Barlow, Ortolani method), and conduct dynamic monitoring during treatment [12].

Types of hip joints:

Type 1a, b: mature joint for the angle α is 60–69 degrees, the angle β is 55–77 degrees.

Type 2a: physiological immaturity of the hip joint up to three months. The angle α is 50 - 59 degrees, the angle β is 56 - 77 degrees, the CCP is ≤ ½.

Type 2B: DTBS in children older than 3 months. The angle α is 43 - 49 degrees, the angle β ≥ 77 degrees.

During functional tests, transient decentration of the femoral head within the acetabulum is detected. It is possible to identify decentration with a change in angular indicators when the position of the subject is changed on the back or on the side, the CCPs are ½ – ⅓.

Type 3a: subluxation (eccentricity). The angle α is less than 43 degrees, the angle β is more than 77 degrees, the bone part of the acetabulum roof is flattened, the head is eccentric, in children older than 3 months, as a rule, the echogenicity of the cartilaginous part of the acetabulum roof is increased (due to prolonged head pressure femur per capsule of the joint), CCPs make up less than ⅓. *type 3b:* with a degenerative change in the cartilaginous part of the acetabular roof, the CCP is less than ⅓. *type 4:* dislocation. There is an ultrasound symptom of the "empty" acetabular cavity. The bony part of the roof of the acetabulum is sharply flattened, the limbus, as a rule, is not visualized, since it is wrapped in the joint cavity.

Of 64 children, the absence of ultrasound pathology of the joints was diagnosed in 12 children (18.8%) (type of joint structure 1a, mature - 8 boys, 4 girls). 13 children (20.3%) (over the age of 2.5 months) were diagnosed with delayed formation of ossification nuclei in the presence of normal angular indices. In 32.8% of cases (21 examined children, of which 14 were girls, 7 boys), type 2a – 2b dysplasia was detected. In 11 children (17.2%) (7 girls, 4 boys), type 2c dysplasia was diagnosed, in all cases accompanied by slow formation of ossification nuclei. In 7 cases (10.9%), 3-eccentric dysplasia was detected. As noted, there is a gender imbalance for hip dysplasia, which is defined by some authors as a risk group and is explained by a greater.

It should be especially noted that girls have noted all severe degrees of delay in the development of joints. Thus, this pathology can be considered gender-related. Given this particular pathology, it seems to us 100% to recommend a screening ultrasound examination of newborn girls. In all cases, when detecting orthopedic pathology, treatment was carried out and during the treatment, children were dynamically monitored.

V. Conclusions

The most optimal time for a screening study is 4-6 weeks of life. At this age, the hip joint is already mostly formed, and pathological changes in the joints revealed during this period lend themselves most to orthopedic correction, since the formation of a dysplastic joint is still incomplete (as practice shows - hip dysplasia in most cases is accompanied by a developmental delay ossification nuclei). Not the least role is played by the fact that the smaller the age of the child, the shorter the period of orthopedic treatment and the less anxiety the forced restriction of movements of the child itself.

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COVID-19 Italian Epidemic: Quarantine with Continuous Spillove

By Dr. Giannotta Girolamo & Giannotta Nicola

Abstract- *Background:* In December 2019, an epidemic started in China caused by a new coronavirus (SARS-CoV-2), probably derived from bats. The Italian COVID-19 epidemic begins on February 21, 2020.

Methods: We have collected and analyzed the data produced daily by the Civil Protection. We cataloged this data and produced tables and graphs to obtain dynamic curves for certain parameters. In addition, we also calculated the change in active cases with the following formula: (newly infected) - (new deaths) - (new recoveries).

Findings: The number of total cases increased by about 40 times in the period 2-20 March (from 2,036 to 80,539). In the same period, the active cases increased by about 21 times (from 1,835 to 37,860). Active cases do not close quickly and remain open for a long time because those who enter in intensive care do not recover before 2-3 weeks. On March 19 Italy's death toll surpasses China's, becoming the country with the highest number of coronavirus deaths in the world. On March 26 the deaths in Italy are more than the double of those of China (8,215 deaths in Italy, vis 3,287 deaths in China).

GJMR-K Classification: *NLMC Code: WC 355*

Strictly as per the compliance and regulations of:

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Conclusion: Poor management of medium cases, in accordance with WHO guidelines, inevitably leads to overload of intensive care units. The progression of clusters in Southern Italy is more pronounced in Campania, Puglia and Sicily. The main cause of the high mortality would be attributable to the partial collapse of the Italian health system.

I. Introduction

In December 2019, an epidemic started in China caused by a new coronavirus (SARS-CoV-2), probably derived from bats. Severe acute respiratory syndrome-coronavirus (SARS-CoV) enters the human cells expressing the ACE2 receptor which is a transmembrane protein with its catalytic site located outside the cell [1]. ACE2 receptors are expressed in various human tissues, including lung and brain [2]. COVID-19 disease is caused by SARS-CoV-2 and has a certain degree of lethality. Although the main cause of death from COVID-19 is severe pneumonia, which often leads to acute respiratory distress syndrome (ARDS), which requires hospitalization in an intensive care unit, the virus is neurotropic and the brain of patients affected from COVID-19 can become infected [3]. It has been shown that in brain sections from SARS patients, the virus was detected almost exclusively in neurons [4, 5]. In addition, human neurons express ACE2 receptors [6]. In studies conducted in mice it has been seen that the virus enters the brain via the olfactory bulb and can cause extensive neuronal infection which can lead to death due to damage of neurons located in cardiorespiratory centers [3]. Furthermore, during the Chinese epidemic from COVID-19 it has been shown that some subjects could have an impairment of the cardiorespiratory centers and that the virus could access the central nervous system through the synaptic connections of the mechanoreceptors and chemoreceptors of the lung and lower airways [7]. In Italy mortality is very high and cannot be justified by a different ACE2 expression, even if ACE2 expression increases with age [8].

In this paper, we presented a series of data relating to the Italian epidemic, and we analyzed some trends. Furthermore, we have identified and listed a series of mistakes and risks related to a not perfect management of the recent epidemic which is still in full evolution. In addition, we compared the four epidemic management models implemented by the UK, China, Italy and South Korea. They are management models that have critical points, and that deserve careful analysis.

II. Materials and Methods

We have collected and analyzed the data produced daily by the Civil Protection. We cataloged this data and produced tables and graphs to obtain dynamic curves for certain parameters. In addition, we also calculated the change in active cases with the following formula: (newly infected) - (new deaths) - (new recoveries).

III. Results

a) Progression of total cases

The total number of cases in the period between 2 and 8 March have more than tripled. In the period between 8 and 14 March the number of cases have still tripled, but they are 10 times those that have been registered on the 2nd March. In the period between 14 and 20 March, the total number of cases have more than doubled, and the number of cases that have been registered was 23 times the number of cases registered on 2 March. In the period between 14 and 20 March, the number of total cases went from 47,021 to 80,539 (Fig. 1). This number is about 40 times that of March 2nd.

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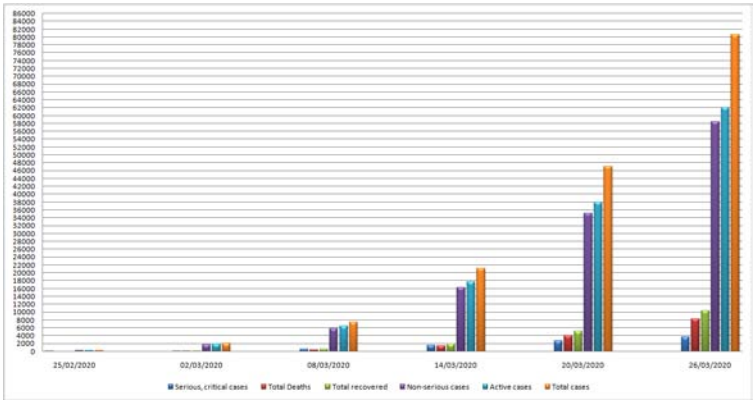

Figure 1: Progression of total cases.

b) Distribution of active cases

Active cases tripled in the period between 2 and 8 March, still tripled in the period between 8 and 14 March (but 9 times the cases registered on March 2). The value of active cases doubled (18,000 vis 38,000) in the period March between 14 and 20 (19 times the value of March 2). In the period between March 20 and 26, the active cases went from 37,860 to 62,013 (Fig. 2).

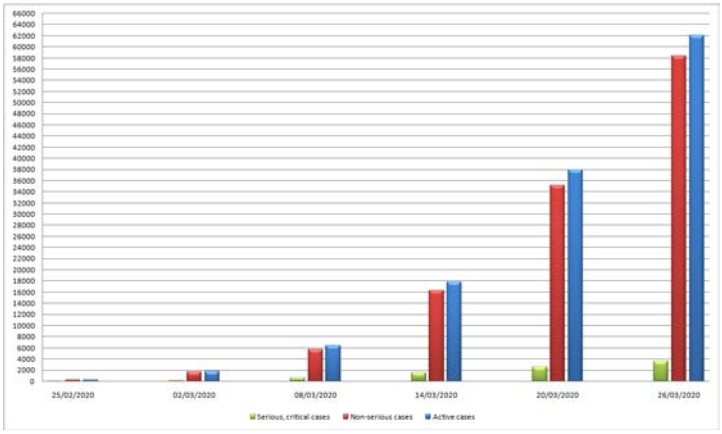

Figure 2: Distribution of active cases between serious / critical cases, and non-serious cases.

c) Change in active cases

Active cases grow consistently over time (Fig. 3). The new deaths and the new recovered become closed cases and leave the active cases. Only the new infected can enhance the curve, but they are too few compared to the total number of active cases and this, in our opinion, means that active cases do not close early and last long in the open case condition. In other words, an infected person who develops a medium to severe disease does not recover soon, probably not earlier than 2-3 weeks. Therefore, every serious subject who ends up in the intensive and / or sub-intensive care units remains there long before reaching clinical recovery.

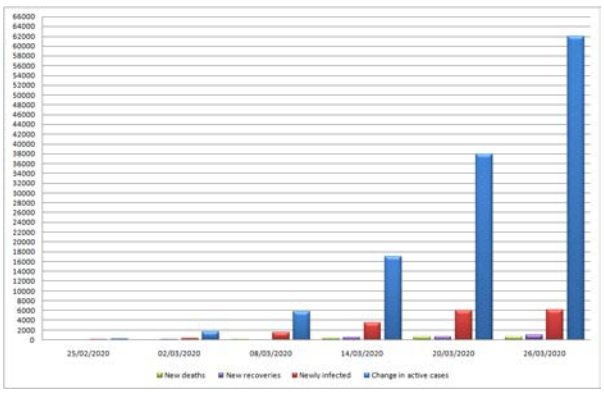

Figure 3: Change in active cases.

d) Clusters in Southern Italy

The progression of clusters in Southern Italy is more pronounced in Campania, Puglia and Sicily (Fig. 4). Since the great exodus of people coming from the Northern and going to the Southern Italy occurred on March 7, and a similar exodus, but of smaller proportions occurred on March 14, it is still early to verify if the "measures of social distancing", suggested by the Italian government, have produced effects in terms of slowing the spread of the infection down.

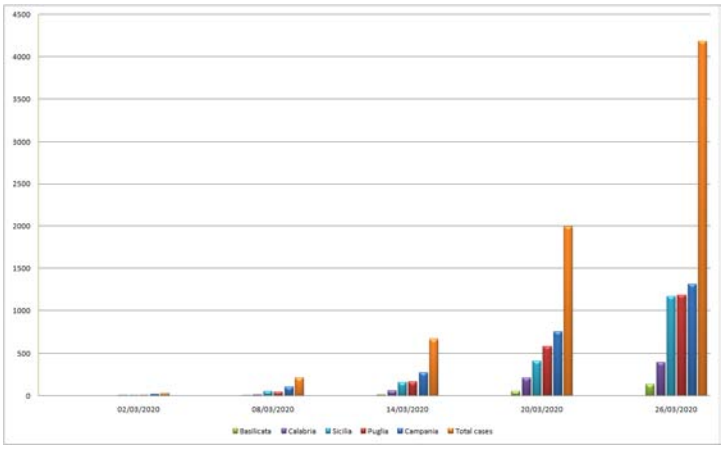

Figure 4: Clusters in Southern Italy.

IV. Discussion

Before describing the characteristics of the Italian epidemic, we will describe the characteristics of four different management models. There are four different models that have been used to combat the COVID-19 epidemic. On our point of view, at present, the model that has been proven most effective is the one used by South Korea, followed by the Chinese totalitarian model. The other two models, the Italian and the English ones, are bad models not to be used in other countries, due to the critical issues they present, and which we will explain.

a) South Korean management

South Korea has been able to slow the progression of the epidemic down. In fact, on March 26, there were 9,241 total cases with 131 deaths, 4,144 recovered, 4,966 active cases, and 59 serious cases. They used a large testing program (tested more than 270,000 people) and they were able to isolate infected people and track contacts in order to quarantine them. New legislation has made it possible to overcome the limitations imposed by privacy laws (which exist in democracies) by giving health authorities the opportunity to reconstruct the movements of test positive subjects. Then, particular applications managed on social media allowed individual subjects to check whether they had contact with infected people [9].

b) Chinese totalitarian model

The military closure of the province of Hubei, the isolation of Wuhan city, the identification of cases and contacts, their mandatory quarantine and the environmental remediation systems in order to prevent the non-human spread, have made it possible to control the epidemic in about 4 months.

c) The English model: Herd Immunity or Herd Mortality?

English prime minister's initial idea, supported by a team of scientists, was to not take any measure to contain the SARS-CoV-2 infection. This was not only a serious political mistake compared to a pandemic, but above all it was a defeat of science. In fact, only children have a great number of natural killer (NK) lymphocytes with adequate cytotoxic capacity, and with an ability to kill cells infected by the virus [10], without a preliminary presentation of foreign proteins by antigen-presenting cells (APC). In addition, these lymphocytes produce several cytokines that regulate the immune system [11], and the NK lymphocytes have immunological memory, like the T- and B-lymphocytes [12].

On march 22, 2020, the citizens of the UK gave a bad test of the perception of the danger, invading beaches and public parks. On march 23, UK Prime Minister Boris Johnson has announced that the country will go into a complete lockdown: Britons will be allowed to leave home only if essential.

d) The Italian model: quarantine with continuous spillover

On February 19, the deaths in Italy exceeded those in China, even though the total number of positivity to the SARS-CoV-2 in Italy was about a half of the ones in China. This unusual virulence at the moment has no plausible explanations and we do not know if it can be related to the characteristics of the coronaviruses circulating in Italy and / or to certain characteristics of the people affected by COVID-19. However, on March 26 the deaths in Italy are more than the double of those in China (8,215 deaths in Italy, vis 3,287 deaths in China).

e) Clusters in Southern Italy

On March 8, a decree law is produced by the Italian government that limits traveling on Italian territory, but this announcement is made on the mass media one day before the publication of the same decree. This announcement completes a mass exodus towards Southern Italy that would have brought more than 100,000 citizens out of the Regions with the highest viral transmission. These citizens arrived at their destination on March 8 when in the 5 Regions of Southern Italy there were only 207 cases of test positivity for SARS-CoV-2 (Tab. 1).

Table 1: Total number of test positivity for SARS-CoV-2.

Region	2 Mar	8 Mar	14 Mar	20 Mar	26 Mar	1 Apr
Campania	17	101	272	749	1,310	2,231
Puglia	4	40	166	581	1,182	1,946
Basilicata	0	4	10	52	134	237
Calabria	1	9	60	207	393	669
Sicilia	7	53	156	408	1,164	1,718
Total cases	**29**	**207**	**664**	**1,997**	**4,183**	**6,801**

On March 26 there are 4,183 test positivity for SARS-CoV-2 (about 20 times, compared to the cases of March 8). This spillover changes the epidemiology and all the prediction models of the Italian epidemic trend, because it inserts a new variable, which on the one hand, leads to the expansion of the viral transmission, and on the other it shortens the duration times of epidemic, because it increases the number of citizens infected by unit of time, and the territories affected by the same viral transmission. In fact, a prediction model of the estimate of the number of patients [13] who could be affected as of March 15, led to an error in the estimate of about 23% (estimated about 32,000 infected patients, vis really infected 24,747).

According to ISTAT data, updated to January 1, 2019, the population of Southern Italy was represented by over 17 million inhabitants [14]. Based on population density, Campania is at a higher risk of spreading the infection, while the risk of spreading is halved in Puglia and then decreases in other Regions, as indicated in table 2. If the positive cases identification measures will work (number of tests), and contacts will be traced and placed in quarantine, the supplementary measures of "social distancing" will slow down the spread of the infection.

However, on March 26, the size of the clusters of Campania differ for a little from those of Puglia (1,310 vis 1,182) and this could be a bad sign for Puglia (Tab. 1).

Table 2: Population and inhabitants density in Southern Italy.

Region	Population	Density Inhabitants / Km^2
Lombardia	10,060,574	422
Campania	5,801,692	424
Puglia	4,029,053	206
Sicilia	4,999,891	194
Calabria	1,947,131	128
Basilicata	562,869	56
Total Inhabitants In Southern Italy	**17,340,636**	

f) Higher mortality than other countries

The Istituto Superiore di Sanità (ISS) states that mortality in persons with confirmed COVID-19, in the Italian population, as of March 17, was 7.2%, much higher than in China (2.3%), and still higher than the one observed in other countries. The fatality rate was defined as number of deaths in persons who tested positive for SARS-CoV-2 divided by number of SARS-CoV-2 cases [15], but the resulting number does not represent the true case fatality rate (CFR) and might be off by orders of magnitude.

However, two facts remain:

1. On March 19 Italy's death toll surpasses China's, becoming the country with the highest number of coronavirus deaths in the world;
2. On March 26 the dead in Italy are more than double those of China (8,215 deaths in Italy, vis 3,287 deaths in China).

In other words, in just 7 days in Italy, the patients who died of COVID-19 are more than the ones who died in China in 4 months epidemic.

If the two epidemics, Chinese and Italian, had ended on March 26, we could have calculated the CFR (the proportion of cases who eventually die from a

disease) with the formula: deaths / cases. On March 26, China would have had a CFR value of 4.04% (3,287 total deaths: 81,285 total cases = 4.04); while Italy would have had a CFR of 10.19% (8,215 total deaths: 80,589 total cases = 10.19). In the absence of raw data, we cannot do any verification and we must rely on what the Italian health authorities publish.

g) The partial collapse of the Italian health system

The National Health System (SSN) is very well organized and provides free assistance to all Italian citizens from birth to end of life. There is a national territorial network where children are assisted by a series of pediatricians who can have 800 patients at the most, and can assist them until they reach the age of 16. Adults also have their own general doctors and have a maximum assisted limit of 1,500 people. Then, there is a territorial network of outpatient specialists and a Hospital network that works more efficiently in Central and Northern Italy. In addition, in the 12 night hours there is a territorial medical guard service for all citizens. On March 25, 40 doctors have died because of COVID-19 [16]. 13 general doctors in Lombardy have died (about 20,000 patients have been left without medical assistance), others are in quarantine (thousands more patients are without medical assistance) as the epidemic progresses. On march 25, There are 6,205 health-care workers positive to SARS-CoV-2 test [17]. The main effect produced by the infection of medical personnel is the failure to diagnose COVID-19 disease, which associated with the difficulty and / or impossibility of performing the necessary tests (staff not sufficient compared to the gigantic requests), also due to the coronavirus positivity of the health personnel assigned to perform the tests, leads to death in a non quantified number of subjects without the suspicion of diagnosis, diagnosis and therapy for COVID-19 disease. The WHO guidelines state that patient with mild COVID-19 should only be treated with antipyretics [18]. A case of medium disease may evolve towards spontaneous healing or may aggravate, contract interstitial pneumonia and end up in an intensive care unit, if there is a possibility, otherwise it will die. This losing strategy increases stress on intensive care units, and increases otherwise avoidable mortality to a great extent. This is what happens in Northern Italy. But the primary cause of this collapse is political, because human resources lost over time have not been replaced.

Since the duration of the disease in hospitalized patients is very long (about 2-3 weeks), the possibility of admitting all the people who need it to the existing intensive care units does no longer exists. Hence, many patients who have died of COVID-19 will not enter on official case series. For this reason, the real mortality is much higher than the current one which is already the highest in the world.

h) Italian mistakes

The first news of Italian COVID-19 disease, in Northern Italy, were reported on 21st February 2020. Genomic investigation estimates that SARS-CoV-2 had started to circulate in the Northern Italian territories between mid-December 2019 and 30th January 2020. This research estimates that in Italy there have been different kinds of introductions of SARS-CoV-2, through people who travelled along the peninsula, and people who live in Italy. The phylogenetic investigations have established that one of the first introductions, in the territory of Northern Italy, took place through a traveler from Germany. It can be reasonable to think that it took, at least, one month from the start of SARS-CoV-2 circulation in Italy and the first communication of the case. In this length of time, virus transmission had no containment.

i) Genomic sequencing

Unfortunately, the failure to control genomic sequences by the Istituto Superiore di Sanità (ISS) has led to serious scientific, political and economic consequences since everyone thought that Italy was the source of widespread contagion, while it was only the territory of multiple viral introductions that derived from infected subjects in many parts of the rest of the world and which essentially transited the territory of Northern Italy. This surveillance would also have served other countries to become aware that their citizens were infected and also circulated outside of Italy.

Andersen et al. [19] claim that SARS-CoV-2 is not a laboratory construct, in fact the receptor binding domain (RBD) in the spike protein (S) of SARS-CoV has ~ 96% identity with a coronavirus present in the bat *Rhinolophus affinis*. However, the external subdomain of Spike's RBD of 2019-nCoV shares only 40% amino acid identity with other SARS-related coronaviruses [20].

In any case, the possible intermediate host has not been identified, even if the primitive zoonotic event occurred in the bat. Spike protein binds to the extracellular part of the enzyme ACE2 (angiotensin converting enzyme 2) which is present in many tissues, including the lung and nervous system. In addition, SARSCoV-2 S glycoprotein harbors a furin cleavage site (lacking in the other SARS-like CoVs) at the boundary between the S1 / S2 subunits that sets this virus apart from others SARS-CoV [21]. The S glycoprotein must be cleaved by cell proteases. Proteolytic processing and receptor-binding act in synergy to induce large-scale S conformational changes promoting coronavirus entry [22]. Furin proteases are abundant in the respiratory tract, and in other tissues.

As of 11 March 2020, the sequences of 35 samples connected to the Italian COVID-19 epidemic are available in some databases. Only 2 of these sequences were produced by Italy [23]. The first sequence was produced by the Spallanzani Institute in

Rome, and belonged to a Chinese woman infected in China; while the second was published by the Istituto Superiore di Sanità, in early March 2020, and derived from a sample obtained from an Italian subject. Before this publication, the genomes of two Brazilian citizens who fell ill on their return and made a trip to Italy had been sequential. The phylogenetic analysis conducted on these two sequences allows Brazilian scientists to hypothesize that there have been multiple virus introductions to Northern Italy [24].

Subsequently, the genome from the first Nigerian patient with COVID-19 who arrived from Italy was sequenced. The phylogenetic tree shows that this genome was introduced in Northern Italy by some persons who came from Germany [25].

Now, we think that the viral genome sequencing, from biological samples obtained from young subjects who fell ill with COVID-19, is necessary.

j) Environmental Stability of SARS-CoV-2

SARS-CoV-2 remains stable on plastic and stainless steel surfaces, while it is less stable on copper and cardboard. The viral titer drops over time [26]. This work confirms that it is necessary to break down the non-human transmission of SARS-CoV-2, as they did in Asia. It is possible that one of the causes of the sustained transmission of the virus in Northern Italy is due to particulate matter. In fact, this territory is home of strong environmental pollution and there is poor air circulation, and in the particulates the viral particles can be adsorbed. If they remain in the particulates, they easily reach the lungs with the breath.

k) COVID-19: an easy diagnosis complicated and delayed by WHO standards

The WHO directives of 29 January 2020 do not allow early detection of COVID-19 disease, because the definition of a suspect case is no longer valid during a pandemic [27]. Since pneumonia due to SARS-CoV-2 infection develops about 8 days after the onset of symptoms, it is difficult to think that a suspect case is subjected to a specific test the first few days of illness, when the transmission of the viral load is maximum. In addition, other cases of illness can occur within 8 days of the contagion of any contacts due to the short incubation period (3-5 days). Furthermore, within these first 8 days of illness this neurotropic virus can enter the central nervous system and produce damage to the bulbar and pontine cardio-respiratory centers.

Rather, attention should also be paid to the loss of the sense of smell and taste, which are symptoms reported by Italian patients in the early stages of the disease.

l) Misinterpretation of the first tests

As of February 26, some countries have published the number of tests and positivity rate for SARS-CoV-2. Our mass media said that we were the best of all in Europe to find out the cases because we did more tests than the others. Table 3 reports these data. However, what we didn't understand, and the French imitated us, that the positivity rates were alarming. In fact, we had 5% positivity rate of the tests and the French had 2.2% positivity rate. Even the USA (3.1% positivity rate) did not understand that this percentage of positivity signaled a widespread circulation of SARS-CoV-2 in those areas subjected to tests.

Table 3: Number of tests and positivity rate for SARS-CoV-2 as of Feb. 26 [28].

Country	Number of tests	Positivity rate
Italy	9,462	5.0%
United States	445	3.1%
France	762	2.2%
Austria	321	0.6%
UK	7,132	0.2%

m) The negative role of Italian scientists on public opinion

Many people were alarmed when the World Health Organization announced in March that COVID-19 has killed 3.4% of the people who have caught it so far a mortality rate far higher than not only the seasonal flu, but also higher than earlier COVID-19 mortality estimates, which were around 2% [29]. Some Italian scientists continue to say in the mass media that seasonal flu is more deadly, even in the presence of over 200 deaths a day [30]. Official data on flu mortality in the 2018-2019 season report 205 deaths [31]. On the single day of 13 March there were 250 deaths from COVID-19 [32]. Then, they say that the virus mainly affects the elderly, while about 60% of infections develop in the age group under 70 years. Even today, some scientists claim that this infection is like a common cold. These facts have heavily affected the civic sense of the population who, by trusting these experts, have exposed themselves to the infection, by not adopting the behaviors useful to avoid it.

In Italy, at June 2020, two new opposite slogans circulate: "The virus has not changed", and "The virus has produced homoplasy".

There are at least two lineages [33] and five different clades [34]. Viruses from both lineages, A and

B, are still circulating in many countries around the world, reflecting the exportation of viruses from Hubei to other regions of China [33]. A new clade should be at least 2 mutations away from its parent major clade. A clade name consists of the year it emerged and the next available letter in the alphabet [34]. The first two clades are 19A and 19B. These clades were both prevalent in Asia during the first months of the outbreak. The next clade is 20A, that dominated large European outbreak in early 2020. There are another two clades: 20B (Europa), and 20C (North American). Moreover, SARS-CoV-2 genome phylogeny analysis reveals that the D614G mutation appeared to arise from an ancestral D residue. This mutation resides in a highly glycosylated region of the viral spike protein [36]. The mutation spike D614G is of urgent concern [36]. In addition, recombinations require frequent co-infections, that are common with many coronaviruses.

Dudas and Rambaut [37], define the degree of homoplasy of the MERS-CoV virus in these terms: "homoplasy degree to be the number of times a given mutation has originated independently minus one". A homoplasy degree of 1 indicates that a mutation has occurred on two different branches in the phylogeny.

n) Deleterious role of mass media

To all of these negative factors we could add the disastrous communication, which has trivialized the harmfulness of this virus, like the typical phrase: "It is just a silly cold", followed by the phrase: "Death with the virus and not because of the virus", and to finish: "I will stay home". To promote all these slogans many guests, believed to be experts (who were not), had been interviewed on TV shows. In this way, the Italian population moved on from the slogan: "It is just a silly cold" to "The Italian quarantine", and while all of this was happening the damaging: "Death with the virus and not because of the virus" was being promoted. To still trivialize people's death, they proclaimed that only the elderly having previous illnesses dies. It happened to be believed that who died was actually "of a certain age". In other words, the age of death of the elderly from COVID-19 really corresponded to completion of life expectancy of the Italian population. But, we know that the virus is extremely virulent and it also infects young people who are in excellent health, and then find themselves in acute respiratory distress syndrome (ARDS) and have to be admitted to intensive care.

On March 25, the mass media, instead of focusing on the deaths caused by COVID-19, resume a television report from 3 years ago (RAI television) which concerned a scientific article. Aided by a number of Italian scientists, they rushed to show that the SARS-CoV2 virus was not a laboratory construct. The work of *Andersen et al*. [19] had already been clear enough about the laboratory construct hypothesis, but in Italy nothing is ever certain. *Menachery et al*. [38], had just done an experiment using an SARS-CoV infectious clone to generate a chimeric virus that expressing the spike of bat coronavirus SHC014 in a mouse adapted SARS-CoV backbone. These authors had demonstrated that group 2b viruses encoding the SHC014 spike in a wild type backbone can efficiently utilize multiple ACE2 receptor orthologs, replicated efficiently in primary human airway cells, and achieve in vitro titers equivalent to epidemic strains of SARS-CoV. The relevant discovery made by these authors was not understood by the mass media and their experts, but they had told us 4 years in advance that a new SARS-CoV beta can use ACE2 receptors to enter human airway cells.

o) Political mistakes

Each political mistake, is the result of one or more scientific mistakes. Since in Italy there is no totalitarian regime like that of China, political decisions are suggested by scientists who occupy national health institutions, which in turn have been nominated by politicians. Public opinion is then heavily conditioned by groups of scientists who are often not informed about the specific case, but constantly appear on talk shows. They are these groups that invented some slogans that distorted the perception of danger in the population and destroyed the already weak civic sense. Many scientific exponents have close relationships with politics and often condition it directly, and indirectly because of the massive media exposure. So we used opinion leaders to harm us, and we hurt ourselves badly.

The only valid political decision to curb the infection was the military closure of Lombardy and Veneto, starting on February 22nd. But all this has not been done. Furthermore, an environmental remediation has not been completed to bring down the non-human transmission of SARS-CoV-2. In addition, the most serious fact is the "spillover quarantine" which implanted the COVID-19 clusters in Southern Italy, which will soon be the site of a new epidemic.

Dr. Girolamo Giannotta, had done some interviews and participated in two talk shows and had produced some serious alarms that politics and health authorities have ignored. He had warned in advance that the spillover would produce the new COVID-19 clusters in Southern Italy, which has now happened. In addition, he raised the problem of field hospitals that were to be built to house the mass of COVID-19 patients who would later be produced and could not be hospitalized in existing intensive care units [39-41].

p) Immunological enigma

The coronaviruses that live in bats are particularly adapted to evade immune detection and dampen human immune responses. An early and correct innate immune response against the virus is very important; while a late immune response can be very powerful and deleterious (hypersecretion of proinflammatory cytokines, and consequent cytokine

storm). In addition, the virus easily induces lymphopenia. Therefore, is critical a viral control in an early phase of infection [42]. Unfortunately, CoVs have evolved several mechanisms to inhibit IFN-I induction and signaling [43].

The surface of SARS-CoV-2 is decorated with trimeric spikes that bind to host cell receptors [44]. There is a high identity of receptor-binding domain (RBD) in 2019-nCoV and SARS-CoV, but the difference in the RBD of SARS-CoV and 2019-nCoV has a critical impact for the cross-reactivity of neutralizing antibodies [45]. CR3022, is a neutralizing antibody previously isolated from a convalescent SARS patient that targets a highly conserved epitope, distal from the receptor-binding site, that enables cross-reactive binding between SARS-CoV-2 and SARS-CoV [46]. There is a potential immunosuppressive domain in S1 that could act in the lung and aggravate the disease, and should not be included in future vaccines [47].

V. Conclusion

Active cases grow consistently over time. This long stay in the intensive care unit does not allow all other patients, who fell ill, afterwards, to be hospitalized at the appropriate time, because there are no vacancies in these intensive care units. Poor management of medium cases, in accordance with WHO guidelines, inevitably leads to overload of intensive care units. The progression of clusters in Southern Italy is more pronounced in Campania, Puglia and Sicily. Since the great exodus of people coming from the Northern and going to the Southern Italy occurred on March 7, and a similar exodus, but of smaller proportions occurred on March 14, it is still early to verify if the "measures of social distancing", suggested by the Italian government, have produced effects in terms of slowing the spread of the infection down.

However, at 1 July 2020, increase in total cases and mortality, from COVID-19 in Southern Italy, is presented in table 4. Vice versa, even if the calculation of mortality is incorrect, because the epidemic is not over (+ 109 new cases), the Lombardy has a mortality rate of 17.71% (case / deaths: 94,010 / 16,650), while in Southern Italy it is 9.95%.

Table 4: Increase in total cases and mortality in Southern Italy, from Mar 26 to Jul 1.

Region	Mar 26	Jul 1	Increase in Total cases	Deaths 1Jul	Mortality %
	Total cases	Total cases			
Campania	1,310	4,699	+ 3,389	432	9.19
Puglia	1,182	4,530	+ 3,348	545	12.03
Basilicata	134	402	+ 268	27	6.72
Calabria	393	1,181	+ 788	97	8.21
Sicilia	1,164	3,081	+ 1,917	282	9.15
Total	4,183	13,893	+ 9,710	1,383	9.95

The main cause of the high mortality would be attributable to the partial collapse of the Italian health system, at the moment of maximum pressure, particularly in Lombardy. The partial collapse of the health system is essentially attributable to the contagion of doctors and health personnel who, for this reason, were unable to assist patients as before. As a consequence, many subjects died without a diagnosis, they were not hospitalized and they did not have a diagnostic test while they were still alive. Many health workers have become infected due to a lack of personal protective equipment, in the exercise of their activity, and many of them died.

The best management system was the Korean one. The biggest mistake made by the Italian, French and American governments is to not have understood that the percentage of test positivity was too high and indicative of an imminent health disaster. The British government has deliberately put itself in a losing position, and a 15-day advantage cannot be given to the SARS-CoV-2 virus. It is a failure to rely on the civic sense of the citizens of the western world, since they do not have the same mentality as Japanese citizens, where the recommendations are equivalent to strict recommendations.

As we predicted, the best managemen model was the South Korean one (Tab. 5), and the results are evident on July 1, 2020 [48].

Table 5: Results of the management model of the individual countries.

Countries	Mar 26		Jul 1		Increase in deaths number
	Total cases	Deaths	Total cases	Deaths	
UK	2,129	578	313,483	43,906	+ 43,328
Italy	80,589	8,215	240,760	34,788	+ 26,573
China	81,285	3,287	83,534	4,634	+ 1,349
South Korea	9,241	131	12,850	282	+ 151

VI. Limitations

Since the data we collect is not in real time, but refers to cases that started 2-3 weeks ago, estimates are affected by these limitations. Furthermore, the raw data are not published in real time by the Istituto Superiore di Sanità (ISS) and we cannot make the best use of them. Because a precise estimate of the case fatality rate is not possible at present, we present in this paper other parameters of COVID-19 Italian epidemic. However, the WHO estimated that the mortality rate is 3.4%, as of march 3.

VII. Future Risk

If this pandemic was generated by a coronavirus that has adapted to only one animal species, not yet identified, pandemic control could occur and re-emergence of the same virus should not occur. Conversely, if another animal reservoir exists, the pandemic may re-emerge in the future. However, if the adaptive process occurred directly in humans, re-emergence would become difficult since the same mutations that favored its diffusion, via the inter-human route, would have to be produced.

The other major risk is ecological because this large circulation of SARS-CoV-2, which occurs in early spring in Europe, coincides with the exit from the hibernation of bats, and in the Veneto [49], and Sardinia [50] there are bats that host several coronaviruses. If SARS-CoV-2 infects bats, recombinant events are possible with the risk of emergence of a new pandemic. Furthermore, the wide circulation of SARS-CoV-2 in the world, allows the virus to produce new mutations that have already led to the second clade G, and which could lead to new more or less invasive clades, compared to the two currently known.

VIII. Perspectives

a) Virology labs

Recombinant coronaviruses, generated by reverse genetic systems have been used to produce chimeric coronaviruses that could be useful as coronavirus vaccines, and for the analysis of the pathogenesis of coronavirus [51]. This means that scientists have been manipulating these viruses in the laboratory for several years, and a biological incident can never be excluded. Laboratories handling coronaviruses may find themselves facing microbes that need a higher level of biosecurity than their current standard. For example, level 3 labs should not manipulate coronaviruses that need level 4 security measures. Hazard Group 4 of viral pathogens are organisms that causes severe human disease and is a serious hazard to laboratory workers. It may present a high risk of spread to the community and there is usually no effective prophylaxis or treatment [52]. Wuhan lab was certified as meeting the standards and criteria of BSL-4 by the China National Accreditation Service for Conformity Assessment (CNAS). Many staff from the Wuhan lab have been training at a BSL-4 lab in Lyon. The Wuhan lab focus on the control of emerging diseases, store purified viruses and act as a World Health Organization 'reference laboratory' linked to similar labs around the world, but SARS virus has escaped from high-level containment facilities in Beijing multiple times [53]. Moreover, Moloney Murine Leukemia Virus (M-MLV), contaminates reverse transcriptase (RT) reagents and also have been detected in previous virome analysis of insectivorous bats in China [54].

The biosecurity level of virology labs must take into account that viruses with all types of genomic structures and replication strategies, have been discovered in bats, and coronaviruses appear to have evolved a fine-tuned balance between masking of the RBM, to limit neutralization by the humoral host immune response, and their necessary exposure, to enable receptor recognition and infection of host cells [55]. Moreover, viral gene fragments identical or quite similar to those of MERS-CoV have also been recovered in bats, raising again the possibility that the bat acts as the natural reservoir of MERS-CoV [56-58]. Given that MERS viral gene fragments are in bats, gene recombination may have allowed the furin cleavage site to be transferred from the MERS-CoV to the new SARS-CoV-2. But this event can take place in a bat that lives in a cave, as in a bat housed in the virology laboratory. All this to reinforce the alarm on virology research laboratories that, perhaps, do not have the biosecurity standards adequate to the firepower expressed by the new coronaviruses.

In summary, the virus derives from bats that live in Yunnah Province, the epidemic broke out in Wuhan (Hubei Province) at 1,186 km away, an intermediate host was not identified after the initial zoonotic event, it is not a laboratory construct but the product of a gene recombination that can take place in a Yunnah cave or in a Wuhan virology laboratory, has a furin cleavage site such as MERS-CoV, is subject to manipulation in virology laboratories, and for this it needs of high biosecurity standards that, perhaps, not all the laboratories that handle them have.

b) Vaccines

When comparing natural disease with vaccination practice it is necessary to remember that the number of antigens presented to the immune system, during viral infection, is significantly higher than the number of antigens that may be present with a candidate vaccine. This allows a wider production of different antibodies directed against different viral

epitopes. In addition, binding and neutralizing antibodies can be produced, but only neutralizing antibodies can stop the virus. With SARS-CoV-2 vaccines, researchers' main safety concern is to avoid a phenomenon called antibody-dependent enhancement (ADE), in which vaccinated people who do get infected develop a more severe form of the disease than people who have never been vaccinated [59]. ADE is a mechanism through which dengue viruses, feline coronaviruses, and HIV viruses take advantage of anti-viral humoral immune responses to infect host target cells. Antibodies against SARS-CoV spike proteins may trigger ADE effects [60]. Immunized ferrets, with recombinant modified vaccinia virus Ankara (rMVA) expressing the SARS-CoV spike S protein, exhibited strong inflammatory responses in liver tissue. Vaccination with rMVA expressing SARS-CoV S protein is associated with enhanced hepatitis [61]. Vaccine-induced antibodies that enhance entry of virus could increase the frequency of B cell infection in vaccinated subjects and alter disease on subsequent exposure to SARS-CoV [62]. Moreover, injection of SARS-CoV vaccines in mice led to the occurrence of Th2-type immunopathology, suggesting that hypersensitivity to SARS-CoV components was induced [63]. Most vaccines carry with them the possibility of side effects that must be considered in ultimately deploying them to the human population [59].

There are more than 100 candidate COVID-19 vaccines in development [64]. The Moderna vaccine consists of an RNA molecule, and it is designed to train the immune system to make antibodies that recognize and block the spike protein [59]. This study has no history of change, and placebo is truly placebo (saline). The press release from Moderna is not very clear [65]. However, all 45 participants were seroconverted, and only 8 out of 45 patients had data on neutralizing antibodies. Since binding and neutralizing antibodies can be produced, we will have to know what is the percentage of subjects that produce neutralizing antibodies.

ChAdOx1 nCoV-19 is an other vaccine currently being investigated (ClinicalTrials.gov NCT04324606). The ChAdOx1 viral vector was developed at the University of Oxford, and consists of an attenuated adenovirus capable of producing the spike protein of SARS-CoV-2. The study starts with a serious scientific mistake, because the menigococcal vaccine (MenACWY) is indicated as placebo [66], while the real placebo does not contain any biologically active substance. In just two months, this study has a history of 8 changes. Conversely, the study started in South Africa [67] uses 0.9% saline as a true placebo (ClinicalTrials.gov NCT04444674).

c) Monoclonal antibodies and convalescent plasma

Most monoclonal antibodies against SARS-CoV spike proteins promoted SARS-CoV infection [60]. The vast majority of patients who recover from COVID-19 illness develop some level of circulating neutralizing antibodies to various SARS-CoV-2 proteins, 2-3 weeks following infection. Convalescent plasma transfusion appears safe [68], but the risks of plasma transfusion include: allergic reactions, transfusion-associated circulatory overload, transfusion-associated acute lung injury, and ADE to the next infection (that has not been documented to date).

Ethical Approval and Consent to participate.

Not applicable.

Our work does not use data concerning patients we follow, but the data are public and derive from the Italian Civil Protection.

Consent for publication

Not applicable

Availability of supporting data

We have transcribed the Civil Protection data on Exel sheets that we can make available for the journal.

Competing interests

We have no conflicts of interest.

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Authors' contributions

Dr Girolamo Giannotta is responsible for writing the text.

Nicola Giannotta took care of the bibliographic research, and produced the part concerning the genomic sequencing.

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Effect of Fermented Kepok Banana Corm Inclusion in the Diet on the Nutrient Digestibility and Mineral Ca and P Retention of Growing Pigs

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Abstract- Sixteen crossbred growing pigs Duroc x Landrace, (10 weeks of age; initial body weight 27 ± 3.92 kg) were allotted into four treatments in a randomized block design to evaluate the effects of inclusion of fermented kepok banana corm (FKBC) in the diet on the nutrient digestibility and mineral ca and p retention of growing pigs. There were four treatments diets offered: basal diets without FKBC (R0); basal diets + 7% FKBC (R1); basal diets + 14% FKBC (R2); basal diets + 21% FKBC (R3). Results of the study showed that inclusion of 21% FKBC in the diet of pigs significantly reduced ($P < 0.01$) dry matter intake and organic matter compared to the control diet. There were no significant difference between 14% and 21% FKBC on the intake and digestibility of dry matter and organic matter of the pigs. However, inclusion of FKBC at the level of 7% showed the optimum digestibility of dry matter, organic matter, crude protein, and energy with the average value of 66.57%, 70.48%, 83.43% and 70.76%, respectively. In addition, mineral consumption and retention of Ca and P were 14.30 and 9.10 g/day, respectively with the value of mineral retention both Ca and P were 11.90 and 7.50 g/day, respectively. It can be concluded that inclusion of FKBC at the level of 7% increased dry matter digestibility and organic matter.

Keywords: *corm, fermented, nutrient digestibility, mineral retention, growing pig.*

GJMR-K Classification: *NLMC Code: WA 360*

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I. Introduction

Pig production in East Nusa Tenggara (ENT) Province, Indonesia is not only to fulfil meat demands, it also uses as savings, as social status and for religious ceremonies, respectively (Anonymous, 2017). The ENT pig population is estimated at ± 1.70 million (Anonymous, 2014), with ± 85% being owned by smallholder farmers (ACIAR, 2010). Pig demand in ENT was 1,134,552 animals per year and pork are a critical source of protein for domestic consumption where about 90% of the population of 5 million are non-Muslim and considered as pork eaters (Anonymous, 2017). However, pig production in this area is still low due to the insufficient of feed both quantity and quality (Anonymous, 2010). In addition, most of raw materials used in the feed industry such as corn and wheat are imported, and consequently resulting in the increase of cost production (Dwyanto and Priyanti, 2009). The utilization of local feed from agricultural by products, on the other hand, are less desirable due to its low nutrients quality. Alternatively, processing such products that locally available through fermentation by utilizing yeast (*Saccharomyces cerevisiae*) and fungus (*Aspergillus niger*) prior to offered to animal as source of feed is necessarily important.

Kepok banana corm (*Musa paradisiaca*) or locally known as fried banana (plantain banana) is usually left in the farm after harvesting the banana fruits and it classified as waste, with its potential production about 40% (Emaga *et al*., 2011). The kepok banana corm utilization as feed sources for livestock, however, is still constrained by the presence of high crude fiber, complex carbohydrates and antinutrition. It has been reported that the starch composed of amylose and amylopectin, which would be hard to be digested by digestive enzymes (English *et al*., 2007). Therefore, complex molecules of starch of kepok banana corm is expected to reduce, through fermentation since yeast (*Saccharomyces cerevisiae*) and fungus (*Aspergillus niger*) contained some enzymes that can broke down the hard part of starch. Previous studies reported that yeast (*Saccharomyces cerevisiae*) contained α-amilase, glukoamilase, selulase, sakrosidase dan lipase (Aiyer, 2005; Winarno, 2010; Uthumporn *et al*., 2010; Kaur and Sekhon, 2012), fungus (*Aspergillus niger*) contained α-amilase, α-glukosidase, β- glukosidase, glukoamilase, selulase, protease, lipase, mananase dan pectinase (Uthumporn *et al*., 2010; Kaur and Sekhon, 2012; Anonim, 2016). Although, previous study argued that kepok banana corm could be used as a source of calories for livestock as it contained 79% carbohydrates, 3385 KCal/kg gross energy, 35% starch but low in protein (3%) (Sembiring *et al*., 2017). However, there is limited information regarding the utilization of yeast and fungus in kepok banana corm fermentation in ENT province, Indonesia. Therefore, the present study aimed to evaluate the kepok banana corm fermented with yeast and fungus on grower pig nutrient digestibility and mineral Ca and P retention. The hypothesis was that the FKBC fed to grower pig will increase both the nutrient digestibility and mineral Ca and P retention.

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II. Materials and Methods

a) Animals, experimental design and feeding management

The study was conducted in Noelbaki Village, Kupang-ENT Province, the village located at distance of ± 25 km to the capital of the ENT Province - Kupang, with altitude of ± 100 m. Sixteen crossbred growing pigs *Duroc x Landrace*, (10 weeks of age; initial body weight 27 ± 3.92 kg), which were obtained from the local farm nearby Kupang city were used. The animals were randomly allotted into one of the four treatments in a randomized block design (n = 4 in each treatment groups). The treatments were consisted of R0: basal feed without FKBC; R1: feed + 7% FKBC; R2: feed + 14% FKBC and R3: feed + 21% FKBC. Feed and water were offered *ad libitum* throughout the course of experiment. The animals were offered feed at three times (08.00, 12.00 and 17.00 oclock) daily to ensure *ad libitum* intakes. Water was provided separately in the bucket.

b) Banana corm processing and fermentation

Fresh kepok banana corms, were obtained from local farmers in the district of Kupang, ENT-Indonesia. The microbial yeast (*Saccharomyces cerevisiae*) used had 1.25 x 10^{13} CFU/g and *Aspergillus Niger* had 1.03 x 10^{12} CFU/g, as determined by the Laboratory of Microbiology, Faculty of Veterinary Medicine, Nusa Cendana University (2015).

Kepok banana corms fermentation: Fresh banana corms were sliced from the peal, cut and sun dried for 3 days and ground into flour through a 2 mm screen. Steamed kepok banana corm flour (substrate) was inoculated with the liquid culture at 10% w/v, as recommended by Azizah *et al*. (2012). The inoculated substrates were enclosed within sealed polybags (2 kg capacity) and fermented under aerobic conditions. The fermentation product was inactivated by drying at 60°C for 24 h, as described by Ozturk *et al*. (2009) and Jenses *et al*. (2013) with modifications, and then stored in sterile plastic bags at 4°C until analysis.

The composition of the feeds used in the present experiment were locally available in this area and commonly used by pig farmers such as corn flour, concentrate, rice bran, fish meal, salt and pigmix. Regarding the present study, corn and rice bran were used as a source of energy and fish meal as a source of protein. The nutrient content of feed used is presented in Table 1.

Table 1: Contents of experimental diets

Feeds sources	Nutrient content	
	Crude Protein (%)	Gross energy (Kcal/kg)
Corn*	8.50	4426
Concentrate**	37.00	3769
Fish meal*	62.90	3770
Rice bran***	13.10	4650
FKBC****	4.40	3511

) Analysis of Feed Chemicals Laboratory, Faculty of Animal Science, Nusa Cendana University, 2014. **) Commercial Feed Concentrate for Pig. *) Robles and Ewan, 1982. ****) FKBC = The fermented kepok banana corm, Analysis of Livestock Breeding Center, Bogor, 2015.*

The banana corm used in the present study was a fermentation product using a combination of yeast and mold. The treated feeds tested on pigs were formulated with the composition and nutrient content as in Table 2.

Table 2: Composition of the experimental diets

Feed sources	Diet			
	R0	R1	R2	R3
Corn meal (%)	48.00	47.00	46.50	45.50
Concentrate (%)	17.50	18.00	18.00	18.50
Fish meal (%)	12.00	12.50	13.00	13.50
Rice bran (%)	21.00	14.00	7.00	-
FKBC (%)	-	7.0	14.0	21.00
Pigmix (%)	1.00	1.00	1.00	1.00
Salt (%)	0.50	0.50	0.50	0.50
Total	100	100	100	100
*Nutrient composition				
Gross energy (Kkal/kg)	4068	3985	3950	3925
Crude protein (%)	20.85	20.65	20.33	20.13

**Determined values from Table 1*

c) Data collection and measurement

The measurement of feed consumption included intake of dry matter (DM), organic matter (OM), Crude protein (CP) and energy were calculated by substracting the daily refusal weight from the weight of the feed offered in the previous day. The digestibility of DM, OM, CP and energy were calculated as the difference between the amount of feed eaten and the amount voided in the faeces. Body weight gain of the pigs were obtained by weighed the animal every week or at the commencement of the study and the end of the study and feed conversion was calculated by deviding the daily intake of nutrients from the body weight gain of the pigs. Retention Mineral Ca and P were calculated by substracting the daily refusal weight of mineral from the weight of the mineral feed offered in the previous day.

d) Statistical analysis

Data were analysed by analysis of variance (ANOVA) with treatment as the sole source of variation in the model. The ANOVA was performed using the IBM SPSS statistics for windows, version 22. Duncan multiple range test was also performed where the level of significant was set at $P < 0.05$.

III. Results and Discussion

a) Chemical composition of the experimental diets

The kepok banana corm was chosen in the present study as an alternative feed supplementation to pigs due to its potential production during harvesting seasons but low utilisation particularly in ENT Province, Indonesia where the quantity and quality of feed is mainly constrained on pig production. The diets contained FKBC in the feed composition contain crude protein as high as 21.00%, which indicates high quality feed for growing pigs. The crude protein and energy concentrations are suited and slightly above the needs of grower pigs (Table 3) based on the recommendations of NRC (1998). Mineral P in feed from vegetable was generally low and almost insufficient to meet the needs of animals (Anselme, 2006). Minerals content of the diets used in the study are still as recommended needs for growing pigs.

The FKBC used in the diet test contained DM and OM of 89.35±1.06 and 86.36±1.12%, respectively. The crude protein content and crude fat were 4.40 and 1.32%. The content of crude fibre, NDF and energy were 17.51±0.99 and 41.23±1.12% and 3511±48.29 Kcal /kg respectively. The content of starch, resistant starch and total sugar ware 35.54±8.43, 25.91±6.85 and 4.11±2.54 g/100g, respectively (Laboratory of the Department of Food Science and Technology, FTP-IPB-Bogor, Indonesia, 2015). Proximate analysis results of the diets was shown in Table 3.

Table 3: Nutrient content of experimental diets

Composition	Diet			
	R0	R1	R2	R3
Dry matter (%)	92.07	90.92	89.61	90.54
Oganic matter (%)	89.02	88.90	87.48	84.88
Crude protein (%)	22.79	22.27	22.73	21.00
Crude fat (%)	6.50	5.32	5.98	5.45
Crude fibre (%)	5.39	5.52	5.82	6.04
CHO (%)	59.73	62.70	60.90	64.09
NFE (%)	54.34	57.18	55.08	58.05
Gross energy (Kcal/kg)	4.303	4.299	4.305	4.294
Ca (%)	0.95	0.81	0.79	0.70
P (%)	0.53	0.51	0.50	0.50

Analysis of feed Chemical Laboratory, Faculty of Animal Science, Nusa Cendana University (2015). CHO = Carbohydrate; NFE = Nitrogen Free Extract

b) *Intake and digestibility of dry matter and organic matter*

Dry matter intake of pigs fed the control diets were significantly higher than those fed the test diets ($P < 0.05$; Table 4). The DM intake in this study is consistent with results of previous studies (Cloutier *et al*., 2015) using growing pigs with body weight of 25-50 kg, given a diet containing the amino acid lysine as a supplement, proved that intake of dry matter was 1840 g/day and the mean body weight gain of 802 g/day. The pig intake and growth can be affected by types of feed used and also influenced by different individual pigs. Mwesigwa *et al*., (2013) stated that feed sources helped influence feed intake. Total feed intake can also be influenced by the concentration of energy, palatability, nutritional content, breed and growth rate (Tillman *et al*, 1989; Kyriazakis, 1994; Ngoc *et al*., 2013).

Organic matter intake tends to decline with increasing levels of FKBC in the diet. However, there were no significant difference between the four treatments ($P > 0.05$) on OM intake (Table 4). This is due to the energy content in the feed is relatively same. Results of previous studies in pigs fed diets containing wheat bran can increase the intake of OM (protein and energy) compared to those containing feed mixed with corn bran and corn seeds (Mwesigwa *et al*., 2013). This result implies energy sources may influenced the OM intake figures of pigs.

Intake value in the study tends to decrease was because of high starch content in the diet which is still difficult to be digested by the digestive tract of growing pigs. The starch in the FKBC diets is still wrapped by polysaccharides.

The DM and OM digestibility tended to decrease at inclusion level of FKBC of 21%. Diet containing 7% FKBC (R1) was not significantly ($P > 0.05$) reduced digestibility of either DM or OM compared with the control diet (R0). Feeding growing pigs with 7% FKBC in the diet (R1), however had higher values of DM and OM digestibility than the other treatments.

DM and OM digestibility were not significantly different ($P > 0.05$) among treatments R0 compared to R1 and between treatment R2 to R3 (Table 4). This finding indicates increasing the level using of the FKBC from 14 up to 21% has not been significantly reduced digestibility of DM and OM. This results are in line with Hanson *et al*., (2012) states that utilization of available energy and other nutrients may increase the production of feces and excretion of nutrients.

In this study, DM and OM digestibility tended to decrease indicated that high content of crude fiber and starch in FKBC resulted in duration of component digesta in the digestive tract be short (Ngoc *et al*., 2013). Since polysaccharide consisting of high starches and resistant starch in the feeds, it will difficult to digest (Englyst *et al*., 2007; Cummings and Stephen, 2007). The ability of the digestive tract to digest and absorb carbohydrates (polysaccharide) is influenced by the degree of polymerization, starches physical shape, size and structure of the constituent starch granules (Bijttebier *et al*., 2008).

Digestibility of feed containing high starch was also affected by balancing level of amylose: amylopectin of the starch, the higher the amylose content resulted in the lower the digestibility (Yin *et al*., 2010), the consequence is the value of the glycemic index increase and occur insulin response (Jun *et al*., 2010).

Table 4: Intake and digestibility of DM and OM in growing pigs (g/day)

Variables	Treatment diets				Anova P values
	R0	R1	R2	R3	
DM intake	1870,99 ± 37,62^{c}	1654,70 ± 28,92^{b}	610,07 ± 47,93^{a}	1610,07± 42,95^{a}	0.718
OM intake	1665,19 ±33,48^{c}	1595,32 ±26,11^{b}	1482,77 ±42,95^{a}	1457,75 ±54,95^{a}	0.892
DM digestibility	65,05 ±5,45^{bc}	66,57 ±6,34^{c}	60,90 ±1,50^{ab}	57,21 ±2,64^{a}	0.010
OM digestibility	68,95 ±4,72^{bc}	70,48 ±6,34^{c}	65,21 ±1,35^{ab}	62,04 ±2,64^{a}	0.013

^{a,b,c,} *values within a row with different superscripts differ, P < 0.05; n = 4 pigs/group*

c) Intake and digestibility of crude protein and energy

Intake of CP and energy tended to decrease with increase level of FKBC inclusion. Duncan test on intake of CP and energy indicated that pigs fed the control diets had significantly higher compared to the rest of treatment diets (P<0.05; Table 5).

Table 5: Intake and digestibility of crude protein and energy

Variables	Treatment diets				Anova P values
	R0	R1	R2	R3	
CP intake	426,30±10.89^{b}	393.48±12.53^{a}	376.11±6.44^{a}	338.11±42,95^{a}	0.979
Energy intake	8049.49±161.89^{c}	7596.96±124.36,11^{b}	7596.92±124.36^{b}	7125.05±256.39^{a}	0.908
CP digestibility	83.74 ±^{bc}	66,57 ±6,34^{c}	60,90 ±1,50^{ab}	57,21 ±2,64^{a}	0.810
Energy digestibility	68,95 ±4,72^{bc}	70,48 ±6,34^{c}	65,21 ±1,35^{ab}	62,04 ±2,64^{a}	0.724

^{a,b,c,} values within a row with different superscripts differ, P < 0.05; n = 4 pigs/group

CP digestibility decreases was also due to feed composition, nutrient levels and the possibility of containing protein inhibitors, tannin and saponin. Levels of tannin and saponin in FKBC used in the feed composition were 915.98 and 360 mg/100g. Tannins in feeds, especially high condensed tannin in nonruminant feeds can lead to be less digest and absorb, less palatabel due to bitter taste and the protein bond (Huisman, 1989; Lipsa *et al*., 2012) and also due to bind starch and resistant starch bond (Zeeman *et al*., 2010).

The study showed that using FKBC up to the level of 21% significantly decreased both intake and digestibility of energy. High starch content in FKBC of 350.50 g/kg, resulted in decreasing the energy digestibility of grower pigs. June *et al*., (2010) stated that starch as a source of energy has low digestibility especially when a proportion of amylose: amylopectin is wide. Decomposition of the starch in the digestive tract becomes difficult to digest if containing high amylopectin (Carre, 2004).

d) Effect of treatment on pig performances

The present study noted that feed intake of pigs fed R3 diet tended to decrease (Table 6). In other word, the higher the level of FKBC, the lower the feed intake. It was notable that the animal offered R3 diets had the lowest average daily gain (ADG) compared to those fed the control diets. Pigs given feed containing 21% FKBC (R3) tend to consume less feed and less average daily gain.

Table 6: Effect on feed consumption, body weight gain and feed conversion

Performance variables	Treatment diets			
	RO	R1	R2	R3
Feed intake (g/day)	2031,69 ±40,86[b]	1987,50 ±32,53[b]	1898,87 ±54,79[a]	1891,51 ±70,33[a]
Avr. DG (g/day)	650,44 ±76,38	579,46 ±56,47	594,64 ±83,73	604,91 ±62,25
Feed Convertion	3,15 ±0,35	3,45 ±0,34	3,23 ±0,51	3,16 ±0,41

[a,b,] *values within a row with different superscripts differ, P < 0.05; n = 4 pigs/group*

The intake of growing pig was influenced by individual animal, age and environment (Reeds *et al*., 1993), and affected by the concentration of energy (Kyriazakis, 1994), palatability, nutrient content, breeds and the rate of growth (Ngoc *et al*., 2013). Feed with high fibers can cause feed conversion increased as a result of duration of digesta in the digestive tract become shorter (Ngoc *et al*., 2013).

The average value of feed conversion showed no differences (P> 0.05) among four diets. This means that the level of 21% FKBC can be administered to growing pigs without lowering the feed conversion. The average feed conversion values obtained are relatively similar between the treatment was due to the nutrient content of feed almost the same (Table 3). Differences in feed conversion rate according to Rideout *et al*., (2008) is closely connected with the process of fermentation in the intestines especially on high starch and resistant starch feeds. Individual animals can also affect the feed conversion (Reeds *et al*., 1993). Feed with high crude fibre can cause feed conversion increased (Ngoc *et al*., 2013).

e) Mineral Intake and Retention of Ca and P in the growing Pigs

Mineral intake of Ca and P found tends to decrease with increasing the levels of FKBC inclusion, as shown in Table 7.

Table 7: Mineral intake and retention of Ca and P (g/day)

Variables	Treatment diets				Anova P values
	R0	R1	R2	R3	
Ca intake	17,82±0,35[d]	14,32±0,23[c]	13,20±0,38[b]	11,28±0,41[a]	0.989
P intake	9,91±0,19[d]	9,08±0,14[b]	8,35±0,24[a]	8,06±0,29[a]	0.949
Ca retention	15,08±1,18[d]	11,87±0,86[c]	10,77±0,78[b]	8,59±0,75[a]	0.978
P retention	8,20±0,57[c]	7,49±0,49[b]	6,66±0,30[a]	6,30±0,17[a]	0.932

[a,b,c,d] *values within a row with different superscripts differ, P < 0.05; n = 4 pigs/group*

Mineral intake of Ca and P decreased significantly (P <0.05) between the control diet and the rest. The highest value was achieved in the control diet (RO) and followed by R1, R2 and R3 diets respectively. Duncan's test show the average value of mineral Ca and P intake were no significant difference (P> 0.05) between R2 and R3 diet. Increasing the level of FKBC from 14 to 21% does not significantly reduced mineral Ca and P intake. This presumably due to the mineral content in the FKBC was low.

Mineral Ca retention in pigs fed R0 (control) showed highly significant (P <0.01) compared with R2 diet, whereas the Ca retention between diet R1, R2 and R3 were significant difference (P <0.05). The achievement in study was in line with Rideout *et al*., (2008) stated that source of starch may influence digestibility of mineral Ca and P in growing pigs at 30 kg body weight. Mineral Ca absorption was affected by the balance of Ca and P in the diet (Tillman *et al*., 1989; Whittemore, 1993).

Mineral P retention was found highly significant (P <0.01) between control diet (R0) compare with R2 and R3 diets. Minerals retention of Ca and P at FKBC inclusion up to 21% was decreased due to high levels of starch and resistant starch content in the FKBC. Previous studies using corn and potato in diet at level of

10% fed in grower pig with body weight of 30 kg was found significantly reduced the digestibility of crude protein and reduces the retention of mineral Ca and P (Rideout *et al*., 2008). This sudy indicated that using diets containing hight content of resistant starch has a negative effect on mineral retention of Ca and P in grower pigs.

IV. Conclusions and Recommendations

a) Conclusion

The inclusion of fermented kepok banana corm at the level of 7% in the diet increased the digestibility in vivo of dry matter from 65.05 to 66.57 (2.3%) and organic matter from 68.95 to 70.48 (2.2%). Inclusion of fermented product up to 21% was not reduce the performance of grower pigs. It can be recommended banana corm fermented product can be applied as feeds at the level of 21% in grower pigs diet without retarded the intake and growth.

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Non-cognitive Skills for Safe Sexual Behavior: An Exploration of Baseline Abstinence Skills, Condom use Negotiation, Self-esteem, and Assertiveness Skills from a Controlled Problem-based Learning Intervention among Adolescents in Tanzania

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Abstract- *Background:* The proper forming and well-being of adolescents is crucial to the development of a country through its potential contribution to economic prosperity. Adolescents aged between 10 to 19 are in the crucial stage of formation of the right personality and character leading to social responsibility. Thus, these early years are important in shaping them for successful investment and intervention in their later years. This study presents baseline cross-section findings from the randomized controlled intervention that aimed at testing the effect of Problem-based Learning (PBL) on non-cognitive skills (abstinence skills, condom use negotiation, self-esteem, and assertiveness) for safe sexual behavior among adolescents in Tanzania mainland.

Methods: The study employed an analytical cross-section design that adopted a clustered quantitative research approach of 647 randomly selected respondents and was conducted between September and December 2019.

Keywords: *adolescent, safe sex, sexual behavior, condom, assertiveness, self-esteem, non-cognitive skills, soft skills.*

GJMR-K Classification: *NLMC Code: QT 225*

NONCOGNITIVESKILLSFORSAFESEXUALBEHAVIORANEXPLORATIONOFBASELINEABSTINENCESKILLSCONDOMUSENEGOTIATIONSELFESTEEMANDASSERTIVENESSSKILLSFROMA CONTROLLEDPROBLEMBASEDLEARNINGINTERVENTIONAMONGADOLESCENTSINTANZANIA

Strictly as per the compliance and regulations of:

Non-cognitive Skills for Safe Sexual Behavior: An Exploration of Baseline Abstinence Skills, Condom use Negotiation, Self-esteem, and Assertiveness Skills from a Controlled Problem-based Learning Intervention among Adolescents in Tanzania

Walter C. Millanzi [α], Kibusi, S.M. [σ] & Osaki, K.M. [ρ]

Abstract- Background: The proper forming and well-being of adolescents is crucial to the development of a country through its potential contribution to economic prosperity. Adolescents aged between 10 to 19 are in the crucial stage of formation of the right personality and character leading to social responsibility. Thus, these early years are important in shaping them for successful investment and intervention in their later years. This study presents baseline cross-section findings from the randomized controlled intervention that aimed at testing the effect of Problem-based Learning (PBL) on non-cognitive skills (abstinence skills, condom use negotiation, self-esteem, and assertiveness) for safe sexual behavior among adolescents in Tanzania mainland.

Methods: The study employed an analytical cross-section design that adopted a clustered quantitative research approach of 647 randomly selected respondents and was conducted between September and December 2019. All respondents were adolescents from selected secondary schools in four district councils within Tanzania mainland. The standardized Sexual-risk Behavior Beliefs and Self-esteem Scale (SRBBSES) questionnaire was used to measure non-cognitive skills among study respondents. Statistical Product for Service Solutions (SPSS) version 23 was used to analyze data and findings were presented in tables by frequencies, percentages, and adjusted odds ratio at 95% confidence interval with a significant level at 5%.

Results: The mean age of the study respondents was 15 years with a minimum of 12 and a maximum of 19 years. Majority of them (57.5%) were females. Findings revealed that 14.2% of the respondents had adequate non-cognitive skills for safe sexual behaviors. 8.8% of respondents demonstrated skills to abstain from sex, 20.4% intention to negotiate using a condom, 12.1%, and 22.1% demonstrated self-esteem and assertiveness skills for safe sexual behavior respectively. Males were found to be more times likely to have adequate non-cognitive skills compared to females (AOR = 1.740; p<0.05; 95%CI: 1.082, 2.797). Additionally, parental financial protection was a protective factor to non-cognitive skills (AOR = 1.865; p<0.05; 95% CI: 1.106, 3.146) among adolescents. In conclusion, most adolescents had low levels of non-cognitive skills for safe sexual behavior, a case that needs prompt interventions to empower them with such skills for their future formation and wellbeing.

Keywords: *adolescent, safe sex, sexual behavior, condom, assertiveness, self-esteem, non-cognitive skills, soft skills.*

I. Plain English Summary

The well-being of adolescents is crucial to the development of a country through its potential contribution to economic prosperity. However, Adolescents aged between 10 to 19 years old face problems ranging from their basic needs to economic needs. Unsafe sexual behaviors among adolescents remain substantial growing public health concerns around the globe. The Ministry of Health Community Development Gender Elderly and Children reported that 27% of adolescents in Tanzania for example, get underage pregnancies and an estimated 8,000 adolescent girls drop out of school every year. Moreover, the report noted that 57% and 48% of young women and men respectively, report having had sex by the age of 18 years. 35% of females and 33% of males aged between 10 to 14 years were reported to have HIV infection.

The current study believed that unsafe sexual behavior develops among adolescents aged between 10 to 19 years persists due to a lack of non-cognitive skills necessary for their early years of life. This study, therefore, aims at exploring baseline abstinence skills, condom use negotiation, self-esteem, and assertiveness skills for safe sexual behavior from a randomized controlled PBL intervention among 647 randomly selected school-going adolescents. As it has worked elsewhere, Problem-Based Learning intervention programs have improved later life outcomes when done in the early years of life because non-cognitive skills are malleable at that time. Findings will help to improve educators'/teachers'/parents' and adolescent's roles in

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sexual and reproductive health. Moreover, they will promote remedial strategies to improve adolescents' reproductive health in Tanzania.

II. Contribution to the Literature

- Education and health Professionals might be enlightened about the levels of non-cognitive skills and its associated factors for safe sexual behavior among school-going adolescents so that age-appropriate and pedagogical innovation sexual and reproductive health intervention can be developed and implemented
- Findings constitute a vital knowledge necessary for instructors on how to design and implement curricula to address the levels of non-cognitive skills of adolescents on safe sexual and reproductive health behavior
- Researchers will also use findings of this study as baseline data for further interventional studies or projects at a large scale

III. Background

The proper formation and the well-being of adolescents are crucial to the development of a country through its potential contribution to economic prosperity (1). The proper formation was defined in this study as a process of forming and shaping one's safe character for the betterment of future behavior and thus, healthy adulthood. Nearly one-third of global morbidity and two-thirds of mortality in adults are associated with conditions or behaviors that begin in adolescence (2). Thus, early years are important in shaping cognitive and non-cognitive skills for their successful investment and intervention in the later years. Cognitive skills focus on knowledge of human biology and development; non-cognitive skills are those associated with how to protect oneself from sexual emotions, desires, dilemmas, and associated social pressure. WHO (3) estimates that, of the 7.2 billion world population, 42% (over 3 billion) are younger than 25 years, 18% (1.2 billion) are adolescents aged 10 to 19 years. About 88% of adolescents live in developing countries whereby Sub-Saharan Africa (SSA) constitutes 18% of them. It is also projected that by 2010 to 2030 the adolescent population in Sub-Saharan Africa will increase to 1.3 billion (4).

Adolescents aged between 10 to 19 face problems ranging from their basic needs to economic needs (5). Their capabilities to regulate sexual impulses and emotions develop gradually in this stage. Emotions here include the desire for intimacy, friendship, and belonging, which at this age translate into temptations to sexual acts at an age when they have little understanding of their consequences. Indeed, suggested data from Schiller (6) neuroscience is that changes in affective processing during adolescence may critical to understanding unsafe behavior in this age period. Moreover, Christopher *et al.,*(7)unfolds that adolescents with poor self-regulation of sexual emotion and behavior in early ages are more sexual risk-taking and might have more sexual partners later in their lives. This study believed that although sex may be seen as emotional involvement, for some adolescents it may start as a commercial endeavor that may lead to emotional (or vice versa) and with health, educational and socioeconomic consequences. According to the report by UNAIDS (8), approximately 250,000 young people in school-age were newly HIV infected globally of which about 182,500 (73%) of them are residing in Sub-Saharan Africa. Moreover, it was reported that trends of new HIV infection have continued to decline from 3.4 million in 1996 to 1.8 million in 2017. However, its progress is slower than the requirement to reach the decline to 500, 000 new infections by 2020.

Exposure to early unsafe sexual behaviors has led to approximately 1 million adolescents aged between 15 to 19 years old, ending up with unplanned pregnancies and Sexually Transmitted Infections (STIs) and Human Immunodeficiency Virus (HIV) infection. These STIs/HIV infections accounted for 60% and 69% of global and SSA reported prevalence respectively.

UNICEF (9) reported that 11% of boys and 6% of girls claimed to have had sex before the age of 15 years globally. They reported early sexual debut, being involved in a sexual partnership with older men, and having unprotected sex. Moreover, risks associated with parental, teachers or peer sexual harassment, drug abuse, teenage pregnancies, childbearing, sexually transmitted infections (STIs)/ HIV/AIDS, and school dropouts have persisted(10).

In the face of early onset of unsafe sex among adolescents, 16 million (11%) girls aged 15 to 19 years give birth each year of which 95% occur in the low and middle-income countries where 10% of girls become mothers by the age of 16 years (11). In the African region, it has been reported from the systematic review and meta-analysis that the prevalence of adolescents' pregnancies reached 18.8% in all Africa whereas 19.3% in the Sub-Saharan African region. Additionally, the prevalence was observed to be high in East Africa (21.5%) and low in Northern Africa (9.2%), the trend, which was discussed to be attributed by inadequate parent-children communication on sexual matters, not attending to school, and lack of maternal education (12). It is well acknowledged that the rate of teenage pregnancies is declining to the hoped threshold across African countries whereas in which Rwanda (7.3%) and Ethiopia (12.4%) have the lowest rate than other African regions. The report revealed the highest percentages of adolescents' pregnancies in Uganda (23.8%) and Tanzania (22.8%) whereas out of 57% of young women and 48% of young men report having had sex by the age of 18 years (13).

Unsafe sexual behaviors among adolescents remain substantial public health, as well as a growing concern in Tanzania. Tanzania Health Management Information System (THMIS) 2012-2017 reported an increase in the prevalence of new HIV and STIs infection from unsafe sex among adolescents (14). Different reports on sexual education in Tanzania (15–19) suggest that adolescents in Tanzania are not well empowered with the necessary soft skills for safe sexual behavior change.

The MoHCDGEC (20) reported that 27% of adolescents in Tanzania, get underage pregnancies. UNICEF (21)reported that an estimate of 8,000 (1,760 in primary schools and 6,240 in secondary schools) adolescent girls dropped out of school due to pregnancy. The rate of teenage pregnancies varied across Tanzanian regions in proportion to secondary school students' enrollment rate, access to knowledge, and life-skills education on sexual and reproductive health. Moreover, MoHCDGEC (22) noted that 57% and 48% of young women and men respectively, report having had sex by the age of 18 years while 35% of females and 33% males aged between 10 to 14 years old, were reported to have HIV infection.

This situation prevails despite many interventions being implemented in different parts of the country including policy and legislation reinforcement by the government, sexual education clubs, large scale reproductive and family planning campaigns, projects, including sexual health education training to teachers (22,23). New infections, unintended pregnancies, and its associated obstetric health outcomes are indicators that ongoing interventions are neither effective in empowering adolescents with non-cognitive skills for them to have informed decision over the sexual activities nor reaching most of the adolescents. Moreover, it has been observed from previous studies and reports that adolescents' levels of non-cognitive skills and behavioral change have changed relatively little.

Non-cognitive skills (soft skills) consist of a set of non-academic competencies, behaviors, attitudes and personal qualities, which enable people to effectively navigate their environment, work well with others, perform well and achieve their goals (Lippman *et al.* 2015). In the current study, non-cognitive skills include adolescents' self-esteem, intention to abstain or be faithful, pre-emptively recognizing forced sexual relationships, negotiation skills, and report and refusal skills of sexual activities. Adolescents who have adequate non-cognitive skills are expected to make informed decisions on sexual behaviors including among others, a protective factor to new STIs/HIV, unintended teenage pregnancies, forced early marriages, and or school dropouts. However, based on the sexual practices, STIs/HIV, teenage pregnancies, and school dropout statistics above, the situation seems to be different and thus needed a deeper investigation.

Watts *et al.,*(26) once unfolded that the early years are important in shaping these skills to lay the foundations for successful investment and interventions in the later years among adolescents aged between 10 to 19. During their early ages, adolescents' minds tend to be malleable to changes around them. They can easily be conditioned to actions and adopt them in their adult lives. Although the curricula seem to do well on students' knowledge and awareness of STIs/HIV, they do not adequately promote soft skills, and healthy behavior, and positive attitude that would allow students to develop healthy lifestyles, which could positively influence shaping safe sexual behavior among adolescents in Tanzania.

The trend has been noted due to the resurgence and an increase in reported new cases of STIs/HIV, sexual debuts, teenage pregnancies, early marriages, school dropouts, and related obstetric complications among adolescents aged between 10 to 19 years old(22,27). This has been witnessed among adolescent girls who experience high levels of youthful fertility sentiments at their young age and consequently may become child parents who depend on their parents.

Zakayo and Lwelamira (28) did a cross-sectional survey to determine sexual behaviors among adolescents in Community Secondary Schools in rural areas of central Tanzania. Their findings revealed that despite adolescents' awareness of sexual and reproductive health, their levels of sexual activity and unsafe sexual behaviors among them were unacceptably high. 51.2% of adolescents initiated sexual intercourse below the age of 15 years, 22% had multiple partners, and 36% did not use a condom in their sexual encounter. With these findings in mind, there seems that adolescents still lack non-cognitive skills to decide for safe sex.

Adolescents, especially young girls who enter first classes in secondary schools face the greatest risk of unreasoned sexual activity, which exposes them to unplanned pregnancies, STIs/HIV, associated obstetric complications, and school dropouts. Mbelwa and Isangula (29) assessed teenage pregnancy in Tanzania (Children having children) and they observed that there are high teenage pregnancies and the use of contraceptive methods is low. They noted that the sexual and reproductive health and its associated services are currently not promising enough to address unsafe sexual behavior among adolescents.

Based on the available and reviewed the information in this study, there seemed to be some unanswered questions about the role of non-cognitive skills (condom use negotiation, self-esteem and assertiveness skills) and its associated factors on safe sexual behavior among adolescents in Tanzania mainland. Among the un-answered questions, include, for example: what do young people think is 'safe'

behavior? How ready are they to practice 'safe' behavior? What forces prevent them from acting safely despite the knowledge they have? and or which innovative age-appropriate teaching and learning pedagogy will promote their non-cognitive skills to make an informed decision over the sexual activities? If the current state continues, new STIs including HIV, unintended pregnancies, and their associated obstetric complications, and school dropouts will continue to prevail.

Given this situation, there seemed a need to investigate non-cognitive skills for safe sexual behavior by exploring baseline abstinence skills, condom uses negotiation, self-esteem, and assertiveness skills from the randomized controlled PBL intervention among adolescents aged between 10 to 19. Thus, the study was guided by four objectives namely to assess: i) adolescents' intention to abstain from sexual intercourse, ii) ability to negotiate condom use, iii) their levels of self-esteem on safe sexual behavior and iv) their assertiveness skills for safe sexual behavior in Tanzania mainland.

IV. Methods

a) Study Design and Approach

This study employed a baseline analytical cross-section design from the randomized controlled PBL intervention. It adopted a clustered quantitative research approach of 647 randomly selected respondents and was conducted between September and December 2019. It intended to assess levels of non-cognitive skills by exploring four aspects including abstinence skills, condom use negotiation, self-esteem, and assertiveness skills for safe sexual behavior among adolescents in Tanzania mainland.

b) Study Location

This study was conducted in Tanzania mainland. The country is located in Eastern Africa between Longitude 29^0 and 41^0 (East) and Latitude 1^0 and 12^0 (South). It has a total area of 883.6 ("000"km^2).Its frontiers include Kenya and Uganda (North), Rwanda, Burundi and Democratic Republic of Congo (West), Zambia and Malawi (South West), Mozambique (South), and the Indian Ocean (East) (30). The population of Tanzania has increased from 12.3 million in 1967 to 55,890,747 million in 2019 of which 27,356,189 are males and 28,534,558 females with a total fertility rate of 5.0 (30).

The country offers public and social services inter alia, health, and education. It has 4,885 secondary schools (3637 public and 1248 private). The country has 2, 023, 205 secondary school students of which 982, 220 were males and 1, 040, 985 females. The enrollment (Form One to Form Six)was estimated to be 2, 148, 466 (1, 056, 498 males and 1, 091, 968 females) (32). Through the National School Health Programme, many adolescents are currently provided with several health-related services that provide reproductive and sexual health information including counseling support in school (MoHCDGEC, 2018). The number of health facilities has increased from 6,321 in 2010 to 7,519 in 2015 (30).

The country has seven administrative zones including Central Zone: (Dodoma, Singida and Tabora), Coastal Zone: (Dar er Salaam, Lindi, Morogoro, Mtwara, and Pwani), Lake Zone: (Geita, Kagera, Mara, Mwanza, Shinyanga, and Simiyu). Other include Northern Zone: (Arusha, Kilimanjaro, Manyara, and Tanga), Southern Highlands Zone: (Iringa, Mbeya, Njombe, Rukwa, Ruvuma, and Songwe), Western Zone: (Katavi, and Kigoma), and Zanzibar: (Mjini Magharibi, Pemba North, Pemba South, Unguja North, and Unguja South). For this study, two (2) out of the seven (7) administrative zones were randomly selected. These included the Central (Dodoma region) and Coastal zone (Lindi region).

c) Dodoma region

Dodoma region lies in the heart of Tanzania in the Eastern-Central party of the country. According to the 2012 national census, the region had a population of 2, 083, 588 of which 471, 958 people had ages between 10 to 19 years old. The National Bureau Statistics (NBS) projected the region's population of 2, 312, 141 by 2017 of whom 1, 126, 309 are males and 1, 185, 833 being females (14). The region has 2 Universities, 220 secondary schools, and 757 primary schools with a total of 83, 549 secondary school students of which 37, 890 were males and 45, 659 females. Administratively, the region is divided into seven (7) districts including; Dodoma City Council, Kondoa, Chemba, Bahi, Chamwino, Mpwapwa, and Kongwa (33). The region has eight Local Government Authorities, 29 Divisions, 209 wards, 6607 Villages, 181 Streets, and 2,184 Hamlets. Kondoa District comprises of Town Council and Kondoa District Council while the rest of Districts have one Council each (33). Two out of seven districts in the Dodoma regionwere randomly selected namely Dodoma City Council and Kondoa District Council). Schools were selected three from each district to make six schools because this was a school-based study.

d) Lindi region

The region is located in the coastal zone at the far end of Lindi Bay, on the Indian Ocean in Southeastern Tanzania. According to the 2012 National census, it had a population of 864, 652 of which 414, 507 were males and 450, 145 being females whereby 180, 532 were aged between 10 to 19 years old. The National Bureau Statistics (NBS) projected the region's population of 983, 700 by 2017 (14). The region has a total of 123 secondary schools and 503 primary schools with 36, 427 secondary school students by 2019 of which 17, 903 were males and 18, 524 being females

(34). Administratively, it is divided into six districts including. They include Lindi Municipal Council, Kilwa, Lindi Rural, Liwale, Nachingwea, and Ruangwa. Two out of seven districts in the Lindi region were randomly selected namely Lindi Municipal Council and Kilwa District Council. Schools were selected because this was a school-based study.

e) Target Population

The target population was school-going adolescents aged between 10 to 19 years old in Tanzania. Contrary to Demographic Health Surveys (DHS) and other studies, data are often describing adolescents aged between 15 to 19 years or included in young adults (15 to 24 years) than younger adolescents (10 to 14 years). This study intended to investigate the full range of adolescents from age between 10 to 19years old among secondary schools found within Tanzania mainland.

f) Study Population

The study populationwas all school-going adolescents aged 10 to 19 years old in Tanzania. This group included most adolescents who were newly sexually matured and active and were therefore prone to engage in unsafe sexual behavior. There is no other period in life when individuals are more likely to exhibit unsafe sexual behaviors than in their adolescent age (10 to 19 years) due to bursts of biological and social changes associated with puberty. Besides, the capabilities of adolescents to regulate sexual impulses and emotions develop gradually in this stage. The majority of them are found in upper primary and secondary schools. Thus, there could be a wide capacity to reach a large number of students and schools were the crucial mediator for preventive health interventions.

g) Sampling Techniques

A simple random sampling method was used to select two out of seven (7) zones in Tanzania including central and coastal zones. Multistage random sampling method was used to select regions (two regions were selected, one from each zone), and districts (four districts were selected; two from each region). A simple random sampling technique by lottery method was used to select secondary schools (12 secondary schools were selected; three from each district). A stratified random sampling technique was used to select classes and a random numbers table sampling method was used to get a minimum sample of the study respondents.

To perform a random numbers table sampling method for achieving a minimum sample size of this study, all participants involved in the study were listed in a piece of paper and numbered them from one to the proportioned number in such a particular school. The researcher then, closed eyes, randomly pointed to a spot on the chart of numbers, move sideways, up or down until the number, which was in the list was found. All participants whose mentioned number was in the list, the number was kept, otherwise, the number was discarded. This process continued until a minimum sample of usable numbers with no repetitions was reached.

h) Control of Strenuous Variables during the Sampling Procedure

The control of confounding effect was done to decrease the errors, which would decrease accuracy in study findings. In this study, a random selection of the study settings and participants was done. Sampling sites were far apart from each other from causing information contamination and both research assistants and the study participants were blinded on the research intent.

i) Sample Size Determination

The study involved a minimum sample size of 647 respondents. The 95% Confidence Interval (CI) was set to determine the effect size of demonstrating statistically significant values of data. The probability that any discrepancy between a sample statistic and a specified population parameter was due sampling and process error or chance was set at a 5% level of significance (expected precision for the difference between means was set at – 2.799 to +2.799). The sample was proportionally distributed to the selected secondary schools in Tanzania mainland, classes, and year of study based on the number of students by using the proportionate formula to get strata ($ni = Pi \times n/P$).

Participation in this study was voluntary. It consisted of all school-going adolescents between 10 to 19 years old, who were admitted and registered and stayed in/out the campus in the respective registered secondary schools as per the semester schedule. Only students who had regular class attendance and who gave the required informed consent participated in this study. However, school-going adolescents who were absent dropped out of school, street children/adolescents, and the sick ones were excluded.

j) Data Collection Process

Quantitative methods, using researcher guided self-administered structured questions was used to collect data. The questionnaires used structured close-ended and Likert type response questions. Sampled and consented study respondents were seated on single and sparse chairs in a room separate from their teachers and parents or relatives for assuring their privacy, confidentiality and make them feel free and comfortable to express themselves. Each study respondent was assigned a code number for easy identification and to ensure anonymity. They were then provided with brief instructions about the process of filling the questionnaires.

The researcher and assistants addressed any queries from them accordingly. Copies of questionnaires were thereafter distributed among them of which they all answered the same questions about soft skills for safe sex after. The process of filling the questionnaires took approximately 15 to 30 minutes for them to finish and submit it to the researcher or assistant researchers. Filled questionnaires were placed in a sealed envelope labeled with study respondents' code to ensure their identity. Two research assistants per classroom were assigned to facilitate the data collection process.

k) Data Collection Methods and Tools

i. *Questionnaires*

The questionnaires used in this study were benchmarked from standardized Sexual-risk Behavior Beliefs and Self-esteem Scale (SRBBSES)(35). This tool was benchmarked as recommended by earlier researchers including Tight, Mok, and Huisman (36) and Unis *et al.,*(37) that used to assess sexual behavior, beliefs, and self-esteem on safe sex. Other benchmarked tools included; Illustrative Questionnaires for interview-surveys with young people from WHO, which was developed by Cleland (38), HIV/AIDS questionnaires (39–41) and TDHS (42). Some language corrections and rearrangements on the order of questions were made to keep the logical flow from simple to complex to address the desired objectives under study.

The questionnaires consisted of 137 items divided into four parts. These includedpart 'A', which assessedDemographic information of the study respondents (112 items). The part was divided into eleven (11) sub-parts such as; i) Individual characteristics (11 items); ii) Parent characteristics (8 items); iii) Family structure (10 items); iv) Child-parent communication on sexual matters (7 items). Other parts were v) Environmental characteristics (10 items); vi) Financial and capital protection (9 items); vii) Neighbourhood characteristics (6 items); viii) Social cohesion (14 items); ix) Sexual ideology, identity and myth (17 items); x) Exposure to media (10 items) and xi) Exposure to drug abuse (10 items).The last part 'B' had questions about non-cognitive (Soft) skills on sexual behavior (25 items).High scores (>12.5) was considered adequate soft skills for safe sexual behaviors, otherwise not.

ii. *Validity*

The tool used in this study was benchmarked from a reliable source that was publicly accessible (38,40,43,44). The tool was adapted from English and then translated into the Swahili language. It was then shared with the supervisors, senior researchers, statisticians, and subject specialists for their technical and professional assistance on content validity, age appropriateness, and contextual appropriateness. Their comments on age, culture, context, and language aspects were addressed accordingly. Assistant researchers were briefly instructed about the research tools. However, they were blinded to the study intention and process.

iii. *Reliability*

The tools used in this study were pre-tested for reliability before use as prescribed by Polit & Chaboyer (42). Pre-testing the tools was done in secondary schools within a region that was different from those, which this study was conducted. The pre-test involved a total of 20 participants and supportive team members including research assistants, curriculum/program developing specialist, sexual and reproductive health specialist, and secondary school teacher who had at least one year experience in teaching.

The reliability of the overall score was assessed after the completion of the pre-test by calculating a Cronbach's coefficient alpha for internal consistency reliability. The 25 items were subjected to the scale analysis for reliability tests for non-cognitive skills assessment for safe sex. Findings indicated the Cronbach Alpha of 0.847 (n = 73; M = 65.60; variance = 278.147 and SD = 16.678). No item was removed from the scale, as none of them had zero variances. Based on Tavakol *et al.,*(45) and Hajjar *et al.,*(46) interpretations and recommendations on making sense of Cronbach alpha, findings of the pilot study assumed that the tool was approximately reliable for an actual field data collection.

iv. *Data analysis*

The Statistical Product for Service Solutions (SPSS), computer software program version 23was used for both descriptive and inferential statistical data analysis. The significance level was at set ≤0.05 of the 95% Confidence Interval (CI) otherwise, the variables were considered to be not related, correlated, or associated with each other. Descriptive data analysis was performed to analyze the demographic characteristics of the study respondents, and findings were presented in tables by frequencies (n) and percentages (%). Chi-square and Cross-tabulation tests were performed to analyze all categorical data about the overall levels of soft skills for safe sexual behaviors among the study respondents. Inferential statistical analysis was used to determine the association between variables (independent and dependent) whereas logistic regression was performed. Findings of inferential statistics were presented in tables by odds ratio (OR), adjusted odds ratio (AOR), probability values (p-value), 95% confidence intervals (CI).

V. Results

a) Participants' Characteristics

The mean age of the study participants was 15 years with 12 and 19 years being the minimum and the

maximum age in years an ill sampled study groups respectively. The most dominating age group (71.2%) ranged between 13 to 16 years of age whereas, 72.5% (n = 103) of the participants were found in Pure PBL, 66.5% (n = 125) in Hybrid PBL and 73.5% (n = 233) in a Lecture group. Female participants were many (57.5%) in all groups compared to males whereby 58.5% (n = 83) female participants were found in a Pure PBL while 58.5% (n = 110) and 56.5% (n = 179) were found in Hybrid and Lecture groups respectively (Table 1).

Additionally, the orphanage and disability status of the study participants were assessed. Findings showed that 10.2% of the study participants (8.5% (n = 12) in a Pure PBL, 20.6% (n = 20) in the Hybrid PBL and 10.7% (n = 34) in the Lecture group) were found to be orphans who were taken care of by their relatives at home. On the other hand, 4.8% of the study participants (8.5% (n = 12) in a Pure PBL, 5.9% (n = 11) and 2.5% (n = 8) in the lecture group) had some forms of physical disabilities. The findings of other participants' characteristics were found as shown in table 1.

b) The Study Participants' Parent Characteristics

The study participants' parent characteristics were assessed in the current study, as the researcher was certain that they could influence the outcome of interest. As shown in table 4.1, only 6.3% of the study participants (3.5% (n = 25) in the PBL, 3.7% (n = 7) in the Hybrid PBL and 2.8% (n = 9) in a Lecture group) their parents had some forms of physical disabilities. It was furthermore; found that out of 467 of the study participants, their parents (40.2% fathers and 47.9%mothers) had primary level of education while 18.1% of study participants' fathers and 25.1% of their mothers had never gone to school (formal education). Moreover, the majority of parents of the study participants (83.6% fathers and 84.9% mothers) were self-employed against 4.6% of their fathers and 9.1% mothers who were not engaged in any wage employment. Other findings of the characteristics of the study participants' parents were as shown in the table.

c) Family Structure of the Study Participants

The findings of this study indicated that out of 647 study participants, 55.8% of their parents lived together in the same house at homes. Furthermore, it was observed that 60.3% of 647 study participants were living with both parents in the same households contrary to 19.9% of them who were living with relatives. In addition to that, the father headed the majority (77.3%) of the study participants' families. In the face of that, 52.1% of the study participants were reared in nuclear families against the participants who lived in extended families. Other findings of the study participants' family structures were as it is shown in table 1.

d) Child-Parent Communication on Sexual and Reproductive Health Matters

The current study believed that studying this variable could be valuable in determining its influence on the level of knowledge about SRH, level of sexual practices, and level of non-cognitive (soft) skills among the study participants over the PBL approach. Findings in Table 1 indicate that very few (26.7%) out of 674 study participants had opportunities to sometimes (17.3%) talk with their parents about SRH matter in which they rarely (2.3%) discussed contraception methods including condom use. Other observations under this aspect were found as presented in the table.

e) Environmental Characteristics where the Study Participants were living

This variable was one among the others, which the researcher of this study hypothesized it could influence the outcomes of interest contrary to the PBL approach. Table 1 signposts that 59.3% of the study respondents were living in parents' own houses whereas 26.6% in rented houses and very few (14.0%) in their relatives' houses. 51.0% of the study participant walked on foot, which out of 647 study participants, 60% took less than 60 minutes to reach their schools regardless of the means of transport they used.

However, findings of this study revealed that of the 647 participants, 66.9% were found to have the habits of sleeping two or more family members in the same room within the household. Additionally, study findings uncovered that out of 647 study participants 63.2% tended to sleep two or more family members in one bed. On the other hand, 62.4% of the 647 study participants were found to have a history of traveling away from home for more than a month for different purposes including visiting to greet relatives and friends. Other environmental characteristics were observed as indicated in the table.

f) Parental Financial Protection, Social Cohesion, Sexual belief, Exposure to Media and Exposure to Drug Abuse among the Study Participants

The above-headed aspects were also determined for their relationship on the outcomes of interest and descriptively presented in this study. As it is disclosed in table 1 that despite 73.6% of the study participants (n = 647) had strong social cohesion (good relationships with families, relatives/teachers, or friends), the majority (67.4%) of them had no parental financial protection.

In contrast, they were also assessed about their sexual beliefs It was revealed that 72.2% of the total study participants (n = 647) had negative sexual beliefs, which means that practicing sex early in young ages has no adverse effects on socioeconomic, cultural, health and education prosperity. Moreover, findings showed that 98.6% of the study participants were exposed to media (either radio, television, magazines, or mobile

phones). The minority (12.8%) of the participants who were involved in this study were found to be exposed to drug abuse (smoking or alcohol use). Table 1 presents more findings of the socio-demographic characteristics of the study participants and other associated determinants of the outcomes of interest under the study.

Table 1: Characteristics of respondents of the questionnaire (n = 647)

Variable	
Age in years	
Mean Age in years	15 Yrs.
Minimum in years	12 Yrs.
Maximum in years	19 Yrs.
Variable	n (%)
Age Groups	
10 to 12 yrs.	58(9.0%)
13 to 16 yrs.	461(71.3)
17 to 19 yrs.	128(19.8%)
Birth space	
1st Born	418(64.6%)
Last Born	229(35.4%)
Gender	
Male	275(42.5%)
Female	372(57.5%)
Religion	
Christian	195(30.1%)
Muslim	452(69.9%)
Orphanage	
Yes	66(10.2%)
No	581(89.8%)
Current year of study in school	
First-year	275(42.5%)
Second-year	174(26.9%)
Third-year	198(30.6%)
Disability	
Yes	31(4.8%)
No	616(95.2%)
Parent Characteristics	
Parents have any Disability	
Yes	21(3.2%)
No	626(96.8%)
The education level of Father	
Never gone to School	117(18.1%)
Primary Education	260(40.2%)
Secondary Education	174(26.9%)
College/University	96(14.8)
The education level of Mother	
Never gone to School	163(25.2%)
Primary Education	310(47.9%)
Secondary Education	49(7.6%)
College/University	125(19.3%)
Occupation of Father	
Self Employed	541(83.6%)
Government/NGOs Employ	76(11.7%)
Not working	30(4.6%)
Occupation of Mother	
Self Employed	549(84.9%)
Government/NGOs Employ	39(6.0%)
Not working	59(9.1%)
Family Structure	
Parents living together in the same Household	
Yes	361(55.8%)
No	286(44.2%)
Living with Whom	
Both Parents	390(60.3%)

Father only	37(5.7%)
Mother Only	91(14.1%)
Relative/Friends	129(19.9%)
Type of family	
Nuclear Family	337(52.1%)
Extended family	310(47.9%)
Head of the family at Home	
Father	500(77.3%)
Mother	73(11.3%)
Relative	74(11.4%)
Child-Parent Communication on Sexual and Reproductive Health	
Communicated with parents on SRH matters	
Yes	173(26.7%)
No	474(73.3%)
Frequencies of communicating with parents on SRH matters	
Always	59(9.1%)
Sometimes	114(17.6)
Never communicated	474(73.3%)
Matters communicated with parents about SRH	
Never Communicated	474(73.3%)
Contraception/Condom	18(2.8%)
STIs	86(13.3%)
Unwanted Pregnancies	82(12.7%)
Sexual relationships	25(3.9%)
Environmental Characteristics	
Nature of the house at home	
Rent house	172(26.6%)
Parents' house	384(59.4%)
Relatives' House	91(14.1%)
Number of people sleeping together in one room at home	
One (Alone)	214(33.1%)
Two and above	433(66.9%)
Number of people sleeping together in one bed at home	
One (Alone)	238(36.8%)
Two and above	409(63.2%)
History of travel away from home for more than a month	
Yes	404(62.4%)
No	243(37.6%)
Hours used to reach to school	
<60 minutes	388(60.0%)
One hr and above	259(40.0%)
Means of transport used to reach school	
On foot	395(61.1%)
Public transport	201(31.1%)
Bicycle	73(11.3%)
Motorcycle	208(32.1%)
Financial and Capital Protection	
Parental Financial Protection	
Yes	211(32.6%)
No	436(67.4%)
Social Cohesion	
Status of Social Cohesion	
Yes	476(73.6%)
No	171(26.4%)
Sexual belief	
Positive	180(27.8%)
Negative	467(72.2%)
Exposure to Media	
Yes	638(98.6%)
No	9(1.4%)
Exposure to Drug Abuse	
Yes	83(12.8%)
No	564(87.2%)

Source: Field Data (2020)

g) *Levels of Non-cognitive (Soft) Skills for Safe Sexual Behavior among the Study Respondents*

Table 2 shows that of 647 study respondents only 14.2% (n = 92) were found to have adequate non-cognitive skills for safe sexual behaviors.

Table 2: Levels of Non-cognitive (Soft) Skills for Safe Sexual Behavior among the Study Respondents (n = 647)

Variable	n(%)
Non-cognitive Skills	
Adequate	92(14.2%)
Inadequate	555(85.8%)

Source: Field Data (2020)

h) *Levels of Non-cognitive Skills for Safe Sexual Behavior among the Study Respondents per Sampled Regions and Districts*

The current study stratified the levels of non-cognitive skills for safe sexual behavior among the study respondents based on their regions and districts. Findings in Table 3 indicate that number of study respondents with adequate non-cognitive skills for safe sexual behaviors ranged between 13.3% (n = 17) in Lindi District council to 16.3% (n = 36) at Dodoma city council. However, there were no statistically significant differences in the levels of non-cognitive skills for safe sexual behavior among the study respondents of both regions (Dodoma and Lindi) and districts (Dodoma, Kondoa, Lindi, and Kilwa) respectively (p>0.05).

Table 3: Levels of Non-cognitive Skills for Safe Sexual Behavior among the Study Respondents per Sampled Regions and Districts (n = 467)

Variable	Non-cognitive Skills		Chi-Square p-value
	Adequate n(%)	Inadequate n(%)	
Regions			
Dodoma	60(14.2)	362(85.8)	0.999
Lindi	32(14.2)	193(85.8)	
Districts Councils			
Dodoma	36(16.3)	185(83.7)	
Kondoa	24(11.9)	177(88.1)	0.605
Lindi	17(13.3)	111(86.7)	
Kilwa	15(15.5)	82(84.5)	

Source: Field Data (2020)

i) *Domains of Non-cognitive (Soft) Skills for Safe Sexual Behavior among the Study Respondents*

Table 4 depicts the frequencies and percentages of the four non-cognitive skill domains for safe sexual behavior among the study respondents. Although they demonstrated inadequate non-cognitive skills for safe sexual behavior in all domains, 22.1% (n = 143) of them had adequate non-cognitive skills on withstanding sexual coercions. Few respondents (8.8%) had intentions to abstain from engaging in sexual activities.

Table 4: Domains of Non-cognitive (Soft) Skills for Safe Sexual Behavior among the Study Respondents (n = 647)

Variable	n(%)
Intention to Abstinence Skills	
Yes	57(8.8%)
No	590(91.2%)
Intention to Negotiate Condom Use	
Yes	132(20.4%)
No	515(79.6%)
Self-Esteem	
Yes	78(12.1%)
No	569(87.9%)
Assertiveness Skills	
Yes	143(22.1%)
No	504(77.9%)

Source: Field Data (2020)

j) Factors Related with the Level of Non-cognitive Skills for Safe Sexual Behavior among the Study Respondents

A descriptive analysis through chi-square and cross-tabulation was conducted in this study to determine the relationship between categorical variables. The twenty-nine (28) variables were subjected to chi-square test and cross-tabulation over the dependent variable (Levels of non-cognitive skills for safe sexual behavior). Findings in Table 5 show that gender of the study participants, walking on foot as a means to reach school, and parental financial protection to adolescents was statistically significantly related to the levels of non-cognitive skills for safe sexual behavior among the study participants ($p<0.05$). Other variables were found not significantly related to the levels of soft skills as shown in the table ($p>0.05$).

Table 5: Factors Related to the Level of Non-cognitive Skills for Safe Sexual Behavior among the Study Respondents (n = 647)

Variable	Levels of Non-cognitive Skills		p-value
	Adequate n (%)	Inadequate n (%)	
Age Groups			
10 to 12 yrs.	6(10.3%)	52(89.7%)	
13 to 16 yrs.	66(14.3%)	395(85.7%)	0.630
17 to 19 yrs.	20(15.6%)	108(84.4%)	
Birth space			
1st Born	56(13.4%)	362(86.6%)	0.418
Last Born	36(15.7%)	193(84.3%)	
Gender			
Male	29(10.5%)	246(89.5%)	0.021
Female	63(16.9%)	309(83.1%)	
Religion			
Christian	24(12.3%)	171(87.7%)	0.360
Muslim	68(15.0%)	384(85.0%)	
Orphanage			
Yes	8(12.1%)	58(87.9%)	0.607
No	84(14.5%)	497(85.5%)	
Current year of study in school			
First-year	43(15.6%)	232(84.4%)	
Second-year	17(9.8%)	157(90.2%)	0.143
Third-year	32(16.2%)	166(83.8%)	
Any Disability			
Yes	7(22.6%)	24(77.4%)	0.172
No	85(13.8%)	531(86.2%)	
Parent Characteristics			
Parents have any Disability			
Yes	6(28.6%)	15(71.4%)	0.056
No	86(13.7%)	540(86.3%)	
The education level of Father			
Never gone to School	21(17.9%)	96(82.1%)	
Primary Education	39(15.0%)	221(85.0%)	0.217
Secondary Education	17(9.8%)	157(90.2%)	
College/University	15(15.6%)	81(84.4%)	
The education level of Mother			
Never gone to School	26(16.0%)	137(84.0%)	
Primary Education	49(15.8%)	261(84.2%)	0.260
Secondary Education	4(8.2%)	45(91.8%)	
College/University	13(10.4%)	112(89.6%)	
Occupation of Father			
Self Employed	76(14.0%)	465(86.0%)	0.636
Government/NGOs Employ	10(13.2%)	66(86.8%)	
Not working	6(20.0%)	24(80.0%)	
Occupation of Mother			
Self Employed	75(13.7%)	474(86.3%)	
Government/NGOs Employ	5(12.8%)	34(87.2%)	0.365
Not working	12(20.3%)	47(79.7%)	
Parents living together in the same Household			

Yes	49(13.6%)	312(86.4%)	
No	43(15.0%)	243(85.0%)	0.597
Living with Whom			
Both Parents	62(15.9%)	328(84.1%)	
Father only	3(8.1%)	34(91.9%)	0.437
Mother Only	11(12.1%)	80(87.9%)	
Relative/Friends	16(12.4%)	113(87.6%)	
Type of Family			
Nuclear	43(12.8%)	294(87.2%)	0.268
Extended	49(15.8%)	261(84.2%)	
Head of the family at Home			
Father	70(14.0%)	430(86.0%)	
Mother	10(13.7%)	63(86.3%)	0.870
Relative	12(16.2%)	62(83.8%)	
Communicated with parents on SRH matters			
Yes			
No	20(11.6%)	153(88.4%)	0.242
	72(15.2%)	402(84.8%)	
Nature of the house at home			
Rent house	23(13.4%)	149(86.6%)	
Parents' house	56(14.6%)	328(85.4%)	0.931
Relatives' House	13(14.3%)	78(85.7%)	
Number of people sleeping together in one room at home			
One (Alone)			
Two and above	32(15.0%)	182(85.0%)	
	60(13.9%)	373(86.1%)	0.707
Number of people sleeping together in one bed at home			
One (Alone)			
Two and above	33(13.9%)	205(86.1%)	
	59(14.4%)	350(85.6%)	0.844
History of travel away for more than a month (Mobility)			
Yes			
No	59(14.6%)	345(85.4%)	0.718
	33(13.6%)	210(86.4%)	
Means of transport used to reach school			
On foot			
Public transport	45(11.4%)	350(88.6%)	0.010
Bicycle	35(17.4%)	166(82.6%)	0.118
Motorcycle	10(13.7%)	63(86.3%)	0.892
	27(13.0%)	181(87.0%)	0.535
Time to reach School			
<60 minutes	54(13.9%)	334(86.1%)	0.788
1 hr. and above	38(14.7%)	221(85.3%)	
Financial and Capital Protection			
Yes	21(10.0%)	190(90.0%)	0.031
No	71(16.3%)	365(83.7%)	
Status of Social Cohesion			
Yes	69(14.5%)	407(85.5%)	0.737
No	23(13.5%)	148(86.5%)	
Sexual belief			
Positive	21(11.7%)	159(88.3%)	0.248
Negative	71(15.2%)	396(84.8%)	
Exposure to Media			
Yes	91(14.3%)	547(85.7%)	0.788
No	1(11.1%)	8(88.9%)	
Exposure to Drug Abuse			
Yes	16(19.3%)	67(80.7%)	0.158
No	76(13.5%)	488(86.5%)	

Source: Field Data (2020)

k) Factors Associated with the Level of Non-cognitive Skills for Safe Sexual Behavior among the Study Respondents

A binary logistic regression was performed to determine the extent of an association to which variables (gender of the study participants, walking on foot as a means of reaching schools, and parental financial protection) had, on the non-cognitive skills for safe sexual behavior among the study participants. Table 6 indicates that with the control of other factors, male participants were found to be more times likely to have non-cognitive skills for safe sexual behavior than female participants (AOR = 1.740; p<0.05; 95% CI: 1.082, 2.797).

Furthermore, the study participants who used to walk on foot to reach schools were 1.836 (AOR) more times likely to have non-cognitive skills for safe sexual behavior as compared to participants who used other means of transports such as bicycles, public min-buses, and motorcycles to reach schools (p<0.05; 95% CI: 1.172, 2.875). Nevertheless, findings in table 4.8 revealed that the study participants who had adequate parental financial protection were found to be more times likely to have non-cognitive skills for safe sexual behavior against those who had not (AOR = 1.865; P<0.05; 95% CI: 1.106, 3.146).

Table 6: Factors Associated with the Levels of Non-cognitive Skills for Safe Sexual Behavior among the Study Respondents (n = 647)

Variable	OR(P-val)	95% CI Low; Upper	AOR(P-val)	95% CI Low; Upper
Gender				
Male	1.729(0.023)	1.080; 2.769	1.740(0.022)	1.082; 2.797
Female (Ref)				
Walking on Foot to Reach School				
Yes				
No (Ref)	1.783(0.011)	1.144; 2.779	1.836(0.008)	1.172; 2.875
Parental Financial Protection				
Yes				
No (Ref)	1.760 (0.032)	1.049; 2.953	1.865(0.019)	1.106; 3.146

Source: Field Data (2020)

VI. Discussion

a) Levels of Non-cognitive Skills among the Study Respondents

A non-cognitive skill among adolescents is a topic that is becoming more relevant due to implications for the health of this population. The alarming statistics on STIs/HIV, unwanted teenage pregnancies, school dropouts, poverty among others, unsafe sexual behavior problems need to be addressed accordingly. Thus, the current study was done to learn about non-cognitive skills and its associated determinants for safe sexual behavior among school-going adolescents in Tanzania.

Based on the findings presented here, this study demonstrates that school-going adolescents suffer from inadequate non-cognitive skills for safe sexual behaviors. Many of them demonstrated low intention to abstain from sex, intention to use a condom during their sexual intercourses, unable to withstand sexual dilemmas, and sexual coercions respectively. This would make them more prone to engage in unsafe sexual activities that would expose them to unintended pregnancies and their related obstetric complications including abortions, stillbirths, preeclampsia and eclampsia, and or fistula, STIs/HIV, and school dropouts. Several factors were observed to have significant influence to empower school-going adolescents with adequate non-cognitive skills for safe sexual behaviors including their biological makeup (gender), the means of transport they used to go to school (walking on foot), and parental financial protections.

It was revealed that the more the adolescents walked on foot to school, there more they developed adequate non-cognitive skills for safe sexual behaviors probably because they might have been frequently taught and reminded either at home or school on how to say "NO" to sexual advance and stick to it. Besides, they might have been exposed and get used to sexual coercion and dilemma to the level they developed mechanisms to defend themselves against it. On the other hand, the current study found that the more the school-going adolescents were provided with adequate financial protection by their parents including emotional attachment, and close parental communication, advice, and or monitoring the more they acquired adequate skills for safe sexual behavior. This fact gives light that good parenting gives hope and confidence to children for them to feel protected and secured enough that other people or the environment would do so.

Thus, if parents, relatives, and or caregivers were as close to their children as possible, it would

positively impact non-cognitive skills for safe sexual behaviors among school-going adolescents. The findings of this study tally with those of Kalolo and Kibusi (47) in their study about perceived behavior control among adolescents. They found 49.7% of the sampled adolescents did not use a condom at their last sexual intercourse and 49.8% had multiple sex partners between the ages of 14 to 17 years. These findings uncovered inadequate levels of non-cognitive skills for safe sex among adolescents that needed to be addressed through safe sex promotion interventions.

In the same vein, Dessie *et al.,*(48)in their study about parent-adolescent sexual and reproductive health communication, found that if adolescents are poorly close and communicating with their parents on sexual and reproductive health, they lack parental security and thus non-cognitive skills for safe sex. Additionally, Castillo-Arcos *et al.,*(49) in their cross-section and explanatory study about resilience on sexual risk behavior of STI among adolescents revealed that early adolescents had lower levels of resilience compared to their counterparts older adolescents. Their findings tally with those of this study as they both imply the need for more interventional studies of sexual risk behaviors among adolescents and factors that affect such conduct.

However, contrary to the cross-sectional findings of this study, Reis *et al.,*(50)determine the effect of sex education in promoting sexual and reproductive health among young people in Portugal. They found most young people had adequate skills of condom use after an intervention. Their findings implied that, without age-appropriate sexual and reproductive health interventions, young people lack adequate skills for safe sex. Moreover, Costa *et al.,*(51) in their study about the impact of age on cognitive variables and safe sex found that young women reported higher concerns on infrequent condom use and abstinence, findings which are different from those found in this study. Different study populations who had different socio-demographic too could be attributed to the difference of these findings. Thus, the findings of this study and those of previous studies unfold the truth that, without being empowered through sexual and reproductive health interventions, adolescents lack adequate skills for safe sexual behaviors.

VII. Conclusion

Referring to the findings above, it can be concluded that most sampled adolescents lack adequate non-cognitive skills for safe sexual behaviors. They demonstrated low skills to abstain from sexual behavior, negotiate condom use, and thus, they had low self-esteem and assertiveness skills for safe sexual behavior. Owing to vital biological processes they adolescents are going through, social and cultural norms that rule over them, and findings from this study, adolescents were more likely to perform unsafe sexual activities. Among other predictor variables, which were tested in this study, the gender of the respondents, means of transport they used to go to school, and parental financial protection from their parents were observed to be associated with the levels of non-cognitive skills.

These factors played an important role in addressing the skills gap since they have been observed in this study that they provide positive empowerment to assist school-going adolescents to develop non-cognitive skills for safe sex. The findings of this study are relevant to the health and educational policies to revisit and refine the existing strategic plans in favor of the potentials of adolescents their educational and sexual and reproductive health prosperity. Moreover, the design of sexual and reproductive health prevention programs and or interventions, need to throw an eye in promoting, emphasizing, and prioritizing sexual and reproductive health information through a variety of innovative teaching and learning pedagogical approaches that focus on involving adolescents in solving their sexual life encounters.

For the education and health professionals, findings of this study provide an opportunity to invest and direct efforts to help improve the existing curricula and or syllabus in a way that promotes non-cognitive skills for safe sex among adolescents. This is of very great potential, as it will help this population to become sexually healthy adults, with the ability to avoid and or make informed decisions over sexual activities.

Declarations

'Ethics approval and consent to participate: applicable', approved by the University of Dodoma (UDOM) Institutional Research Review Committee (IRRC)'.

'Ethics Clearance to reach schools: approved by education officers of the respective schools in the regions and districts of the sample.

'Consent for publication: not applicable'

'Informed Consent: parents/teacher or legally acceptable representatives were asked for a written informed consent on behalf of the study respondents for their participation in this study.'

'Availability of Data and Materials: not applicable

'Competing interest: none'.

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'Author's contributions: W.C.M (MSc. & PhD candidate) performed research, analyzed data, and wrote the manuscript; K.MO appraised research materials, reviewed and reshaped the concept of this work; S.M.K.

shaped the research idea/concept and research tools, and H.B. edited this work.

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List of Abbreviations

AIDS……Acquired Immunodeficiency Syndrome
HIV……..Human Immunodeficiency Virus
MOEVT……..Ministry of Education and Vocational Training
MoHCDGEC…….....Ministry of Health Community Development, Gender Elderly, and Children
IRRC……Institutional Research Review Committee
PBL……...Problem-based Learning
PO-RALC…….Permanent Secretary Regional Administration and Local Government
OBL……..Outcome-Based Learning
SPSS…….....Statistical Package for Service Solution
STIs…….....Sexual Transmitted Infections
UDOM……..University of Dodoma
WHO…….World Health Organization

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Integrated Assesment of Indian Spices as Immunity Boosters

By Shraddha Sinha & Meetkamal

Abstract- With the outbreak of pandemic immune boosting is very essential for each and every human being. The idea of boosting your immune system is appealing which can only be achieved by intake of essential food ingradients in our daily meals. Functional foods may be designed by supplementation with an active ingredient that is known for its health benefits. The long list of beneficial physiological effects of Indian spices like Turmeric, Ginger, Fennel, Cinnamon suggest that it might be considered as an essential part of human diet and act as potential antioxidant and antiviral agents.

Keywords: immunnity, antiviral, antiinflammatory, antioxident, spices.

GJMR-K Classification: NLMC Code: QW 540

Strictly as per the compliance and regulations of:

Integrated Assesment of Indian Spices as Immunity Boosters

Shraddha Sinha [α] & Meetkamal [σ]

Abstract- With the outbreak of pandemic immune boosting is very essential for each and every human being. The idea of boosting your immune system *is* appealing which can only be achieved by intake of essential food ingradients in our daily meals. Functional foods may be designed by supplementation with an active ingredient that is known for its health benefits. The long list of beneficial physiological effects of Indian spices like Turmeric ,Ginger , Fennel , Cinnamon suggest that it might be considered as an essential part of human diet and act as potential antioxidant and antiviral agents,

Keywords: immunnity, antiviral, antiinflammatory, antioxident, spices.

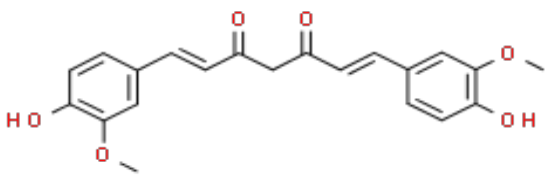
I. Introduction

Immune system helps us to defend against the viruses, bacteria and other microorganisms that causes various types of diseases. Therefore a healthy immune system protects us by first developing a carrier that stops those invaders or germs from entering the body. Immune system also produces white blood cells and other chemicals and proteins that attack and destroy these foreign substance and keep our body healthy. So it has become mandatory to keep our immune system strong. The disastrous effect of novel corona virus disease COVID 19 has rapidly spread all over the world as a pandemic, also declared by WHO. Till now no specific drug or vaccine has emerged to control this pandemic. The rising problem of morbidity and mortality justify the search and adoption of new tools and measures to minimise the impact of COVID 19.

The key which can save us from COVID19, is our immunity. If our immune system is strong it can save us to some extent from the attack of virus and to enhance our immunity, the food plays a key role. Food is determining our overall health and immunity. Therefore to enhance the immunity we should take inmmunity boosters. Natural immunity boosters are foods, fruits, vegetables and spices that help us to increase the ability to fight against illness by enhancing our immunity. Ayurvedic system depend upon the natural things since a long time. It has been claimed for their efficacy without side effects, low cost and they have been evaluated boosters to combat current COVID 19 pandemic and is practised all around the globe. In this paper we will discuss some important natural ingradients like Turmeric (Haldi), Ginger (Adrak), Cinnamon (Dalchini), Fennel (Jeera) which are very useful to enhance our immunity.

II. Turmeric

Turmeric is known for its healing powers. It contains lipopolysaccharide a substance with antibacterial, antiviral and antifungal properties, that help to stimulate the human immune system .It is also known as Indian saffron due to its brilliant yellow colour. The main constituent responsible is curcumin which is a beta-diketone that is methane in which two of the hydrogens are substituted by feruloyl groups. Commercially available curcumin is a combination of three molecules together called curcuminoids. The percentage of curcuminoids is 60-70% followed by demethoxycurcumin (20-27%) and bisdemethoxy-curcumin (10-15%) [1]. Besides curcuminoids the other active components of turmeric include sesquiterpenes, diterpenes, and triterpenoids [2]. The immunomodulary abilities of curcumin arise from its interaction with various immunomodulators including not only cellular components such as dendritic cells, macrophases and both B and T lymphocytes but also molecular components involved in the inflammatory processes such as cytokinines and various transcription factors with their downstream signalling pathways .



Structure of Curcumin

The modulatory effects of curcumin on the TLR4/ MyD88/ NF-kB signalling pathway have been reported not onlyin brain injury models but also in experimental colitis [3] , in LPS induced mastitis [4] and in Helicobacter pylori induced gastritis [5] pointing out the importance of this pathway in the development of different diseases. Besides curcumin, the other bioactive components of *Curcumalonga* have been investigated for their abilities to modulate the immune system are

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alpha-turmerone and ar-turmerone, these two compounds are isolated from lipophilic fraction and they induce PBMC proliferation and cytokine production [6]. The same effect were also shown by the polar fraction of turmeric hot water extract [7]. Therefore whole *C.longa* extract is used to enhance the immune stimulant activity in immunosuppressed patients.

III. Ginger

Ginger (*Zingiberofficinale* Roscoe, Zingiberaceae) is one of the most commonly consumed dietary condiments in the world [8]. Its spicy aroma is mainly due to presence of ketones, especially the gingerols, which appear to be the primary component of ginger studied in much of the health-related scientific research. The rhizome, which is the horizontal stem from which the roots grow, is the main portion of ginger that is consumed .The oleoresin (i.e., oily resin) from the rhizomes (i.e., roots) of ginger contains many bioactive components, such as gingerol (1-[4′-hydroxy-3′-methoxyphenyl]-5-hydroxy-3-decanone.which is the primary pungent ingredient that is believed to exert a variety of remarkable pharmacological and physiological activities. Gingerol believed to be the most abundant bioactive component of ginger root.

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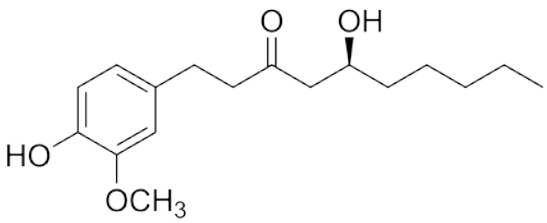


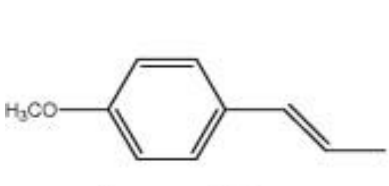
Gingerol

Ginger has been used for thousands of years for the treatment of numerous ailments, such as colds, nausea, arthritis, migraines, and hypertension. Ginger is widely used as an antioxidant, anti-inflammatory agent, antinause a compound [9-12], and anticancer agent as well as the protective effect of ginger against other disease conditions are reviewed. Ginger root contains a very high level (3.85 mmol/100 g) of total antioxidants. One of the many health claims attributed to ginger is its purported ability to decrease inflammation, swelling, and pain. Gingerol, a dried ginger extract, and a dried gingerol-enriched extract were each reported to exhibit analgesic and potent anti-inflammatory effects. The most common and well-established use of ginger throughout history is probably its utilization in alleviating symptoms of nausea and vomiting. The benefits and dangers of herbal treatment of liver and gastrointestinal distress have been reviewed[13].Ginger is also used to treat asthma, diabetes, and other conditions[14].

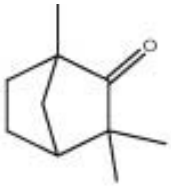
Asthma is a chronic disease characterized by inflammation and hypersensitivity of airway smooth muscle cells to different substances that induce spasms, and ginger has been used for centuries in treating respiratory illnesses. Components of ginger rhizomes are reported to contain potent compounds capable of suppressing allergic reactions and might be useful for the treatment and prevention of allergic diseases [15]. Ginger is not only an extremely popular dietary condiment used for flavoring food but also an herb that has been used for thousands of years as a medicinal herb to treat a variety of ailments. Chemical and metabolic analyses have revealed that ginger comprises hundreds of compounds and metabolites [16]. The most extensively studied bioactive components include gingerols and shogaols. The content of each component is clearly dependent on the source and preparation of the ginger rhizome.

IV. Fennel

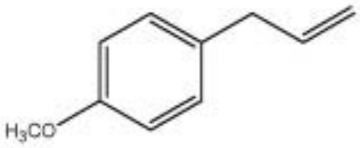
Foeniculumvulgare, commonly known as fennel[17], is a flavourful culinary herb and medicinal plant. Fennel plants are green and white, with feathery leaves and yellow flowers. Both the crunchy bulb and the seeds of the fennel plant have a mild, licorice-like flavour. Yet, the flavour of the seeds is more potent due to their powerful essential oil.Its aroma active compounds such as anethole (and its polymers like dianethole and photoanethole) estragole, (+)-Fenchone and *p*-anisaldehyde.



Trans- anethole

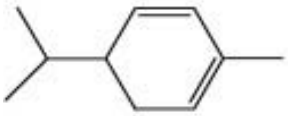


Fenchone



Estragol

Para-anisaldehyde



alpha-phellandrene

Aside from its many culinary uses, fennel and its seeds offer a wide array of health benefits and may provide antioxidant, anti-inflammatory, and antibacterial effects[18]. its biologically active molecules possessing oestrogenic, a caricidal and antithrombotic activities. Fresh fennel bulb is a good source of vitamin C[19], a water-soluble vitamin critical for immune health, tissue repair, and collagen synthesis. Both the bulb and seeds contain the mineral Magnese which is important for enzyme activation, metabolism, cellular protection, bone development, blood sugar regulation, and wound healing Aside from manganese, fennel and its seeds contain other minerals vital to bone health, including Potassium, Magnesium, and Calcium[20]. Perhaps the most impressive benefits of fennel and fennel seeds come from the antioxidants and potent plant compounds they contain. Essential oil of the plant has been shown to contain more than 87 volatile compounds, including the polyphenol antioxidants rosmarinic acid, chlorogenic acid, quercetin, and apigenin. Polyphenol antioxidants are potent anti-inflammatory agents that have powerful effects on your health. The fennel essential oil has been reported to exhibit antifungal effect [21]. Oral administration (200 mg/kg) of *F.vulgare* fruit methanolic extract has been reported to show inhibitory effects against acute and subacute inflammatory diseases and type IV allergic reactions [22]Studies suggest that people who follow diets rich in these antioxidants [23] have a lower risk of chronic conditions like heart disease, obesity, cancer, neurological diseases, and type 2 diabetes . Studies show that fennel extract inhibits the growth of potentially harmful bacteria and yeasts, such as *Escherichia coli*, *Staphylococcus aureus,* and *Candida albicans* [24-25]. *F. vulgare* is a medicinal and aromatic plant with a diverse pharmacological spectrum and having considerable importance in particular to food industry.

V. Cinnnamon

Cinnamon is a spice that is obtained from the inner bark of trees known as cinnamomum. The common name is Dalchini. Antioxidants protect body from oxidative damage caused by free radicals. Cinnamon is loaded with powerful oxidants such as polyphenols and proanthocyanidins. These compounds give a boost to the immune system. Moreover the antioxidants have anti- inflammatory effects which may help lower the risk of disease[26]. Cinnamon may improve some risk factors for heart disease , 120mg/day cinnamon can reduce level of total cholesterol , bad LDL cholesterol and triglycerides, while good HDL cholesterol remains stable [27]. The polyphenols have been shown to reduce oxidative stress through the inhibition of 5-lipoxygenase. Cinnamaldehyde one of the main active component which inhibits the growth of fungi including yeasts, filamentous molds, dermatophytes and the eggs and the adult of human head lice. 2'hydroxy cinnamaldehyde found in bark can inhibit the production of nitric oxide by altering the activation of the nuclei factor kappa- light chain enhancer of activated B cells. This mechanism reflects that cinnamon have anti-inflammatory activity [28]. Anticancer property of cinnamaldehyde was shown by altering the activity of necrosisfactor kappa betta and the production of tumor necrosisfactor alpha induced interleukin 8 in A375cells. Concentration of triglycerides (TG) level and total cholesterol became significantly lowered after consuming Cinnamon extract 200 mg/kg body weight for 6 weeks[29].

Recent studies showed that essential oil of Cinnamon have antibacterial activity against *E,coli*, *S.aureus, B. Cereus* and *P. aeruginosa* and antifungal activity against *Aspergillus* and *Fusarium* and *Pencillium* species [30-32]. The antioxidant capacity of Cinnamon in various test systems indicates that Cinnamon has a large number of pathways for inhibiting oxidation [33]. The understanding of the potential antioxidant activities of Cinnamon in various systems, so it is used in food industry [34]. Phonolic and volatile compounds in Cinnamon play several role in the antioxidant activities[35-37]. Vanillicacid, caffeic acid, gallic acid, p-coumaric acid, p-hydroxy benzoic acid, p- hydroxyl benzaldehydeare typical polyphenol [38]. In general the goal of phenolic compounds and antioxidants enrichment in food is to improve the functionality of food and the prevention of various diseases associated with stress and it used as immunity boosters [39,40]

VI. Conclusions

A World Health Organisation report[1] indicates an increase in the use of traditional medicines or phytomedicines or herbal medicines globally [41] .All the spices mentioned above have a lots of medicinal benefits due to the presence of various bioactive components in them. Their constant use help us in boosting our immunity against COVID 19 without any side effects and also help us in medicating against other diseases also directly or indirectly. Therefore it is preffered and recommended by the medical practitioners for regular use of these condiments in one or the other form.

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Certificate, LoR and Momento **2** discounted publishing/year **Gradation** of Research **10** research contacts/day **1 GB** Cloud Storage **GJ** Community Access	**Certificate,** LoR and Momento **Unlimited** discounted publishing/year **Gradation** of Research **Unlimited** research contacts/day **5 GB** Cloud Storage **Online Presense** Assistance **GJ** Community Access	**Certificates,** LoRs and Momentos **Unlimited** free publishing/year **Gradation** of Research **Unlimited** research contacts/day **Unlimited** Cloud Storage **Online Presense** Assistance **GJ** Community Access	**GJ** Community Access

Preferred Author Guidelines

We accept the manuscript submissions in any standard (generic) format.

We typeset manuscripts using advanced typesetting tools like Adobe In Design, CorelDraw, TeXnicCenter, and TeXStudio. We usually recommend authors submit their research using any standard format they are comfortable with, and let Global Journals do the rest.

Alternatively, you can download our basic template from https://globaljournals.org/Template

Authors should submit their complete paper/article, including text illustrations, graphics, conclusions, artwork, and tables. Authors who are not able to submit manuscript using the form above can email the manuscript department at submit@globaljournals.org or get in touch with chiefeditor@globaljournals.org if they wish to send the abstract before submission.

Before and during Submission

Authors must ensure the information provided during the submission of a paper is authentic. Please go through the following checklist before submitting:

1. Authors must go through the complete author guideline and understand and *agree to Global Journals' ethics and code of conduct,* along with author responsibilities.
2. Authors must accept the privacy policy, terms, and conditions of Global Journals.
3. Ensure corresponding author's email address and postal address are accurate and reachable.
4. Manuscript to be submitted must include keywords, an abstract, a paper title, co-author(s') names and details (email address, name, phone number, and institution), figures and illustrations in vector format including appropriate captions, tables, including titles and footnotes, a conclusion, results, acknowledgments and references.
5. Authors should submit paper in a ZIP archive if any supplementary files are required along with the paper.
6. Proper permissions must be acquired for the use of any copyrighted material.
7. Manuscript submitted *must not have been submitted or published elsewhere* and all authors must be aware of the submission.

Declaration of Conflicts of Interest

It is required for authors to declare all financial, institutional, and personal relationships with other individuals and organizations that could influence (bias) their research.

Policy on Plagiarism

Plagiarism is not acceptable in Global Journals submissions at all.

Plagiarized content will not be considered for publication. We reserve the right to inform authors' institutions about plagiarism detected either before or after publication. If plagiarism is identified, we will follow COPE guidelines:

Authors are solely responsible for all the plagiarism that is found. The author must not fabricate, falsify or plagiarize existing research data. The following, if copied, will be considered plagiarism:

- Words (language)
- Ideas
- Findings
- Writings
- Diagrams
- Graphs
- Illustrations
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- Printed material
- Graphic representations
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- Electronic material
- Any other original work

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2. Drafting the paper and revising it critically regarding important academic content.
3. Final approval of the version of the paper to be published.

Changes in Authorship

The corresponding author should mention the name and complete details of all co-authors during submission and in manuscript. We support addition, rearrangement, manipulation, and deletions in authors list till the early view publication of the journal. We expect that corresponding author will notify all co-authors of submission. We follow COPE guidelines for changes in authorship.

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Unless specified in the notification, the Editorial Board's decision on publication of the paper is final and cannot be appealed before making the major change in the manuscript.

Acknowledgments

Contributors to the research other than authors credited should be mentioned in Acknowledgments. The source of funding for the research can be included. Suppliers of resources may be mentioned along with their addresses.

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Preparing your Manuscript

Authors can submit papers and articles in an acceptable file format: MS Word (doc, docx), LaTeX (.tex, .zip or .rar including all of your files), Adobe PDF (.pdf), rich text format (.rtf), simple text document (.txt), Open Document Text (.odt), and Apple Pages (.pages). Our professional layout editors will format the entire paper according to our official guidelines. This is one of the highlights of publishing with Global Journals—authors should not be concerned about the formatting of their paper. Global Journals accepts articles and manuscripts in every major language, be it Spanish, Chinese, Japanese, Portuguese, Russian, French, German, Dutch, Italian, Greek, or any other national language, but the title, subtitle, and abstract should be in English. This will facilitate indexing and the pre-peer review process.

The following is the official style and template developed for publication of a research paper. Authors are not required to follow this style during the submission of the paper. It is just for reference purposes.

Manuscript Style Instruction (Optional)

- Microsoft Word Document Setting Instructions.
- Font type of all text should be Swis721 Lt BT.
- Page size: 8.27" x 11'", left margin: 0.65, right margin: 0.65, bottom margin: 0.75.
- Paper title should be in one column of font size 24.
- Author name in font size of 11 in one column.
- Abstract: font size 9 with the word "Abstract" in bold italics.
- Main text: font size 10 with two justified columns.
- Two columns with equal column width of 3.38 and spacing of 0.2.
- First character must be three lines drop-capped.
- The paragraph before spacing of 1 pt and after of 0 pt.
- Line spacing of 1 pt.
- Large images must be in one column.
- The names of first main headings (Heading 1) must be in Roman font, capital letters, and font size of 10.
- The names of second main headings (Heading 2) must not include numbers and must be in italics with a font size of 10.

Structure and Format of Manuscript

The recommended size of an original research paper is under 15,000 words and review papers under 7,000 words. Research articles should be less than 10,000 words. Research papers are usually longer than review papers. Review papers are reports of significant research (typically less than 7,000 words, including tables, figures, and references)

A research paper must include:

a) A title which should be relevant to the theme of the paper.
b) A summary, known as an abstract (less than 150 words), containing the major results and conclusions.
c) Up to 10 keywords that precisely identify the paper's subject, purpose, and focus.
d) An introduction, giving fundamental background objectives.
e) Resources and techniques with sufficient complete experimental details (wherever possible by reference) to permit repetition, sources of information must be given, and numerical methods must be specified by reference.
f) Results which should be presented concisely by well-designed tables and figures.
g) Suitable statistical data should also be given.
h) All data must have been gathered with attention to numerical detail in the planning stage.

Design has been recognized to be essential to experiments for a considerable time, and the editor has decided that any paper that appears not to have adequate numerical treatments of the data will be returned unrefereed.

i) Discussion should cover implications and consequences and not just recapitulate the results; conclusions should also be summarized.
j) There should be brief acknowledgments.
k) There ought to be references in the conventional format. Global Journals recommends APA format.

Authors should carefully consider the preparation of papers to ensure that they communicate effectively. Papers are much more likely to be accepted if they are carefully designed and laid out, contain few or no errors, are summarizing, and follow instructions. They will also be published with much fewer delays than those that require much technical and editorial correction.

The Editorial Board reserves the right to make literary corrections and suggestions to improve brevity.

Format Structure

It is necessary that authors take care in submitting a manuscript that is written in simple language and adheres to published guidelines.

All manuscripts submitted to Global Journals should include:

Title

The title page must carry an informative title that reflects the content, a running title (less than 45 characters together with spaces), names of the authors and co-authors, and the place(s) where the work was carried out.

Author details

The full postal address of any related author(s) must be specified.

Abstract

The abstract is the foundation of the research paper. It should be clear and concise and must contain the objective of the paper and inferences drawn. It is advised to not include big mathematical equations or complicated jargon.

Many researchers searching for information online will use search engines such as Google, Yahoo or others. By optimizing your paper for search engines, you will amplify the chance of someone finding it. In turn, this will make it more likely to be viewed and cited in further works. Global Journals has compiled these guidelines to facilitate you to maximize the web-friendliness of the most public part of your paper.

Keywords

A major lynchpin of research work for the writing of research papers is the keyword search, which one will employ to find both library and internet resources. Up to eleven keywords or very brief phrases have to be given to help data retrieval, mining, and indexing.

One must be persistent and creative in using keywords. An effective keyword search requires a strategy: planning of a list of possible keywords and phrases to try.

Choice of the main keywords is the first tool of writing a research paper. Research paper writing is an art. Keyword search should be as strategic as possible.

One should start brainstorming lists of potential keywords before even beginning searching. Think about the most important concepts related to research work. Ask, “What words would a source have to include to be truly valuable in a research paper?” Then consider synonyms for the important words.

It may take the discovery of only one important paper to steer in the right keyword direction because, in most databases, the keywords under which a research paper is abstracted are listed with the paper.

Numerical Methods

Numerical methods used should be transparent and, where appropriate, supported by references.

Abbreviations

Authors must list all the abbreviations used in the paper at the end of the paper or in a separate table before using them.

Formulas and equations

Authors are advised to submit any mathematical equation using either MathJax, KaTeX, or LaTeX, or in a very high-quality image.

Tables, Figures, and Figure Legends

Tables: Tables should be cautiously designed, uncrowned, and include only essential data. Each must have an Arabic number, e.g., Table 4, a self-explanatory caption, and be on a separate sheet. Authors must submit tables in an editable format and not as images. References to these tables (if any) must be mentioned accurately.

Figures

Figures are supposed to be submitted as separate files. Always include a citation in the text for each figure using Arabic numbers, e.g., Fig. 4. Artwork must be submitted online in vector electronic form or by emailing it.

Preparation of Eletronic Figures for Publication

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.

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.
- 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.
- 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:

- Report the method and not the particulars of each process that engaged the same methodology.
- 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.
- 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.
- Skip all descriptive information and surroundings—save it for the argument.
- 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:

- Sum up your conclusions in text and demonstrate them, if suitable, with figures and tables.
- 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:

- 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.
- Do not present similar data more than once.
- 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?
- 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.

The Administration Rules

Administration Rules to Be Strictly Followed before Submitting Your Research Paper to Global Journals Inc.

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References	Complete and correct format, well organized	Beside the point, Incomplete	Wrong format and structuring

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