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Covid 19 Pandemic on Adolescents

Perception and Experience of Parents

Highlights

Model for Prediction of Composition

Dispersion of Multidrug-Resistant Bacteria

Discovering Thoughts, Inventing Future



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Perception and Experience of Parents on Monitoring their School Going Adolescents- A Qualitative Study Conducted in Kandy District, Sri Lanka

By Gayani K. P. De Silva & Devani S. Dissanayake

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Abstract- Parents remain as the gatekeepers in adolescents' lives and need to practice parental monitoring which provides awareness of their offspring's whereabouts, activities, and companions. The study aimed to explore the perception and experiences of parents about their monitoring practice of school-going adolescents in Kandy district, Sri Lanka. A qualitative study was done using twelve focus group discussions conducted using a semi-structured mediator guide questionnaire. Thematic analysis of the discussed data was performed. Schools in the Denuwara education zone, Kandy district. One hundred and seventeen parents of school-going adolescents (14 -16year) were included using the purposive sampling method. Twelve focus groups were formed with ten parents for ten discussions in each group and nine and eight parents participated for another two. Parents were informed via their schooling adolescents and received a participant information sheet which was completed and returned if they decided to participate in the focus group discussions.

Keywords: *parental monitoring, perception, experiences, adolescents.*

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Perception and Experience of Parents on Monitoring their School Going Adolescents— A Qualitative Study Conducted in Kandy District, Sri Lanka

Gayani K. P. De Silva ^α & Devani S. Dissanayake ^ο

Abstract- Parents remain as the gatekeepers in adolescents' lives and need to practice parental monitoring which provides awareness of their offspring's whereabouts, activities, and companions. The study aimed to explore the perception and experiences of parents about their monitoring practice of school-going adolescents in Kandy district, Sri Lanka. A qualitative study was done using twelve focus group discussions conducted using a semi-structured mediator guide questionnaire. Thematic analysis of the discussed data was performed. Schools in the Denuwara education zone, Kandy district. One hundred and seventeen parents of school-going adolescents (14 -16year) were included using the purposive sampling method. Twelve focus groups were formed with ten parents for ten discussions in each group and nine and eight parents participated for another two. Parents were informed via their schooling adolescents and received a participant information sheet which was completed and returned if they decided to participate in the focus group discussions.

Most parents understood it as an unintentional act by them while very few understood it as an intentional activity. Parents' perception varies based on their expectations and on the sex of the adolescent child as well as the parent. Relationship status, communication, and trust were the factors predicting parental monitoring perception of parents in terms of quality and quantity of monitoring practice. Experiences mainly described strategies by which parents monitor their adolescents which included communication with the adolescent child, gaining information by direct questioning from the adolescent child's friends or their parents and monitoring their adolescents by controlling their activities. Parents accept that their own childhood experiences play a major role in practicing monitoring as parents. Furthermore, they came across the barriers they are facing while monitoring their adolescents to the maximum.

Keywords: *parental monitoring, perception, experiences, adolescents.*

I. INTRODUCTION

Parents remain the most important figures in adolescents' lives. They use different strategies, styles, practices, and approaches with the key

components of parental engagement such as monitoring, controlling, and communicating to support the development and maintain the health and wellbeing of adolescents. Parents need to practice a kind of parenting behavior that regulates and provides awareness of their offspring's whereabouts, activities, and companions. To know about adolescents' use of free time and the time that they are spending outside the house without the presence of their parents, the functioning of this hypothetical construct called "parental monitoring" by the parents is important. It is also a major determinant of good quality parent-adolescent relationships and vice versa (Borawski et al., 2003) and is a main domain of parenting (Strunin et al., 2015).

Parents are the main gatekeepers of their adolescents' lives, as they engage in many outdoor activities with strangers experiencing new challenges. As children grow older, however, parents become less likely to engage in looking and being more concerned about their adolescent kids than before. Monitoring is often highlighted as a preventional intervention strategy employed by parents to address the antisocial and delinquent behavior of their adolescent children (Laird et al., 2010). However, recent research work has broadened the conceptualization of monitoring to acknowledge both parents' and adolescents' contributions to the monitoring process. Even though the parental monitoring construct develops as a bidirectional concept where both adolescents and parents involve actively, it is important to assess parental monitoring perception separately. While many studies of parental monitoring assess how much adolescents perceive that they are monitored by their parent(s), only some assess how much parents perceive that they monitor their children qualitatively as well as quantitatively. The vast majority of studies on parental monitoring are quantitative by nature, which leads to a lack of in depth understanding of how parents define and perform their role as important agents in this area. Parental monitoring can also be bifurcated into monitoring by each parent (e.g., maternal and paternal monitoring activities in heterosexual couples), in which

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children and/or parents rate the level of monitoring in which each parent engages.

Since the parent's role has been established as an important aspect of parental monitoring, it is important to explore parental perception and share their experiences aiming to identify and evaluate the facts on parental monitoring in the study's cultural context. Sri Lanka has been considered as having a family-based culture in which the parent's role has considered as a significant factor in one's life and this culture accepts and considers an adolescent as a child even if they are moving forward with their physical, psychological, and social developments with seeking more and more independence and autonomy. However, the busy lifestyle of parents has led to lesser involvement with adolescents in the recent past and also the risk behavior involvement among Sri Lankan adolescents has shown a tremendous increase during the last decade. Many studies have been done to identify factors that lead adolescents' behavior to risks and to explore concepts needed in the prevention of risk behavior involvement of the adolescents other than many of the parenting behaviors and parents' involvement.

Parental monitoring also has not been explored in detail in the Sri Lankan context, even though this has been identified as a much important concept worldwide focusing positively towards healthier adolescents with minimizing adolescents' involvement in risk behaviors. Furthermore, exploring the content of parental monitoring through identifying true perceptions and experiences of parents will help to design effective parenting programs to promote better parenting as well as healthier adolescence through improving parents' monitoring practices.

II. METHODS

A qualitative study was conducted through focus group discussions (FGD) with biological parents of schooling adolescents in the age group of 14 -16 years in Denuwara education zone in Kandy district. Qualitative exploratory approach is ideal in situations in which to no data currently exists as well as when researchers use a primarily inductive approach to explore a broad research area (Rendle et al., 2019). Ten FGDs were conducted with ten parents for each. For two FGDs, there were only nine and eight participants. Parents were informed through purposively selected schooling adolescents about their recruitment for the study. Either father or mother of selected adolescents was invited by key contacts (class teachers) to participate in the parent session. A parent with any severe psychological impairment for themselves or a parent with an adolescent with physical or psychological impairment and biological parent who is widowed or remarried were excluded.

Investigators developed a mediator guide to collect data following a thorough literature review and conducting discussions with experts from the fields of psychology, public health and sociology whose expertise lies in working with Sri Lankan adolescents. The mediator guide included an introduction for the discussion and a section with semi-structured open-ended follow-up questions addressing two main areas; parents' experiences and their perceptions on parental monitoring. To ensure integrity and trustworthiness, all the discussion questions were reviewed by a panel of experts. Pretesting and the content validity of the guide were assessed before using it in the study proper.

This study was conducted during the period from December 2019 to January 2020 and all FGDs were held at school premises in classrooms, on Saturdays. Discussions were conducted separately from each other using the moderator guide, by the principal investigator, who was specially trained in conducting FGDs and qualitative research. All discussions were held in Sinhala. One portion of the discussion was dedicated to exploring perceptions of monitoring and the other portion of the discussion was to share the experiences of monitoring behavior. The area of the discussion was changed in subsequent discussions to elaborate on the pattern of expressions of the participants. The duration of the parent's discussions varied from 60 to 90 minutes. An observer was also present during the discussions and took notes about the qualities of interactions between participants including any perceived power imbalances and participants' level of engagement. The verbal responses were noted down manually during the discussions by the observer and the discussions were tape-recorded with the consent of participants maintaining confidentiality. Special attention was given to prevent non-verbal clues through body language. Participants were given time to have interactions. In addition, they were encouraged to have a free flow of thoughts and tried to keep the discussion on track, drawing information from participants as much as possible, monitoring the length of discussion on particular topics and maintaining a neutral stance. Participants were given enough time to think as well. Probing was done as and when necessary until the participant ran out of new information to share.

Audio recordings with the use of notes taken during the discussions were transcribed verbatim into Sinhalese and translated into English by a research assistant. Narratives written down were confirmed and corrected after listening to the recordings of the discussions repeatedly. Pseudonyms were assigned in the places of real names of parents to maintain the anonymity of the data. Transcripts and translations were checked with the original audio-recording by the principal investigator.

Thematic analysis approach was used for analyzing collected qualitative data through an iterative

process of reading, coding, recoding and summarizing into themes manually. Transcripts were repeatedly read to prepare descriptive codes, which consisted of all emerging information with the key ideas and concepts expressed by participants. Descriptive codes with associated text segments were organized to identify common themes reflexively. Credibility was established by the two authors by comparing and verifying the theme construction, arriving into a consensus and by debriefing with a team of experts to provide an external check on the research process (Nowell et al., 2017).

Ethical clearance for the study was obtained from the Ethical Clearance Committee, Faculty of Medicine, University of Peradeniya, Sri Lanka before the commencement of the study. Administrative clearances were obtained from the Ministry of Education, relevant Zonal Directors of Education and school principals. All participants were informed about the nature of the study before the discussions through a description and a written informed consent document and all gave their consent to participate. Participants were advised that their participation was voluntary and that they could withdraw their consent to participate at any time without penalty or explanation. Participants were also informed that confidentiality would be maintained by the researchers.

III. RESULTS

All parents (117) engaged in FGDs were Sinhalese (100%) while the majority of them were Buddhist (97.4%) Of the sample, many of them were mothers (63.25%) while only 28.2% of the sample represented working mothers. The age range of the parents was 29 - 63 years. Parents' mean age was 51.5 (SD = 5.69). Majority were over 45 years of age (78.63%). The educational level of the group varied from non-attendance to school to a diploma holder. Many of them (35.2%) have been educated up to G.C.E. Ordinary Level.

a) Themes Emerged Regarding Experiences in Parental Monitoring among Parents

Themes that emerged regarding perception about parental monitoring among parents were the understanding of parental monitoring by parents, expectations of parents about adolescent lives, the role of the sex and perceived factors affecting the amount and the quality of parental monitoring done by parents.

i. Understanding of Parental Monitoring by Parents

For most parents, parental monitoring was an unintentional act. They were describing their activities making them relevant to parental monitoring but without having the intention of practicing it. One parent stated, "I know almost all the things done by my child, about their tuition classes, where are they going and what they do almost all the time. So, I think it is a part of my day-to-day life activities. I have to get used to that, actually, we

just talk about things, about her friends, and about her classes and we share the things we did when we were not together." There were few parents with reasonable understanding and they intentionally monitor their adolescent child throughout. One mother mentioned, "I'm practicing different ways since my child is a kid, to identify changes and issues with my kid. I am well aware that it is important to monitor my kid at this age period. I also think I know all the things about him. If we do it as a usual thing, we can monitor our kids even with our busy schedules." However, the majority of participated parents understood monitoring as an important act that makes adolescents prevent involving risky behaviors. A mother stated: "Yes, if we do not look into their day-to-day activities, of course, they will go beyond limits, they will have bad companions." A father made a statement-making that how sure he was doing things to prevent his son from experiencing risky behaviors, mentioning as, "If we ask and monitor their activities, and all about their friends, I'm sure that they will not face any risks in day to day lives." Again, he emphasized saying, "I can help him find his friends...I meant to identify good ones." Furthermore, some parents perceived a hierarchy of frequency of different parental monitoring skills and methods which will affect the seriousness of risk behaviors on different levels.

ii. Expectations of Parents about Adolescent Lives

Perception of parents about parental monitoring was identified into a theme where it describes how they were trying to fulfill their expectations of children or their willingness to make their children succeed in all aspects through parental monitoring practice. Some parents perceived monitoring as a thought of monitoring their child's academic work using different strategies. This fact ensures the statements made by mothers who stated, "I mostly monitor my kid's educational things. I think as I pay attention more and monitor his work only, he performs well" and "I have given him targets, I am monitoring him whether he is achieving those targets and doing his work properly." Few parents were expecting that their adolescent child should know good things and bad things and to know right and wrong. This was evidenced by the following statements made by a few parents. "I can track him to the best if I monitor him well" and "I don't want my child to behave badly which will make him feel embarrassed as well as I, being his mother."

iii. Role of the Sex of the Adolescent

Even though the parental monitoring concept was accepted as one of the important parenting practices by both mothers and fathers, there were differences in the level of responsibility that they thought of and had salient perceptions according to the sex of the parent. A father phrased that, "mothers should know in and out about their child's activities, where they are and with whom they spend time and mothers should

know all his friends." Most fathers have given the responsibility to mothers saying that mother has to monitor their children. Even most of the mothers accepted that they are closer to their kids than their fathers due to many reasons and they are more capable of doing monitoring effectively. One mother mentioned, "I stay at home, I'm not working. So, kids are with me all the time and I always keep in touch with them. I ask and talk about their activities done outside the home than my husband." It was also revealed that parents have the perception of monitoring both their girls and boys in different ways. They came out with many different reasons such as cultural differences in how they accept girls and boys and different types and levels of risk exposures affecting both male and female kids. A mother stated: "I have a daughter; it is very easy to monitor them. She is so close to me and we are very comfortable talking about things any time." And a father stated, "I think boys of this age group are more inquisitive, they try to experience new things more than girls. So... we should monitor boys more". One parent came out with a phrase confirming this theme, "Our girls are more scared than boys. They expect our guidance more than our sons and they are reluctant to do bad things. So, we should do more monitoring on our sons."

iv. *Perceived Factors Affecting the Amount and the Quality of Parental Monitoring done by Parents*

Factors facilitating the monitoring of school-going adolescents appeared to dominate the discussion in most focus groups. Monitoring was perceived to be a constant challenge by parents, characterized by the need of balancing some often-discussed factors such as: maintaining an open relationship and good communication with their adolescent children and to make adolescents' trust over parents. Many parents perceived the good communication and relationship between them, and the adolescent child may improve as they ask and show concern about the adolescent's whereabouts, activities and companions. A mother stated "When asking things about their activities and friends, I'm sure that they will feel that we care for them and we have concerns about them" and a father stated, "If we have a good relationship, like... if we can share things like friends, we can get information related to their activities and friends and we can more easily guide them. For that... I share my day-to-day work experiences with him. So that it develops a good relationship between us when we spend some time together, I have experienced that when I am doing so, he is also sharing his things with me." Many parents were worried about the trust that they accept from their adolescent children. This was shown from statements made by a few parents, such as, "We should ask things in a way that they feel we are friends, and not harming the trust that they have in us" and "As we have a good bond, I don't have to monitor him doing special things. I trust him and

love him. Normally, as we share things in our lives, I feel that he trusts me so much as well." Throughout the discussion, parent-adolescent communication was identified and highlighted as it is coinciding with parental monitoring. A mother mentioned, "We both communicate frequently, we have time to spend with my child, so, it made it easy for us to share information... that I don't have to take special effort on monitoring."

b) *Themes Emerged Regarding Experiences in Parental Monitoring among Parents*

During analysis, statements were identified, compared and intergraded to generate a few main themes namely, strategies of parental monitoring, childhood experiences of parental monitoring and barriers experienced in monitoring their adolescents representing how parents experienced doing monitoring within the context of their life situations.

i. *Strategies of Parental Monitoring*

There are different methods mainly identified during analysis in which parents were practicing monitoring their adolescent children. Majority of parents have done monitoring by directly asking things from their adolescent children about their activity plans and things about their friends. Some of them reported the need to have direct interactions with their children's friends to monitor their adolescents. Many parents came to the consensus that their adolescents are under their control assuming that it helps to find out and to have an idea of things their adolescents was doing and where they are exactly when they are away from home.

ii. *Childhood Experiences of Parental Monitoring*

Parents came up with their childhood experiences while exchanging parental monitoring views. A mother stated, "I was so happy to be monitored by my parents... that I felt they have a concern for me. So, I think my daughter is thinking in the same manner... as she responds well when I ask things from her... I don't feel she is getting upset when I am questioning her about the places where she was or things about her friends." A different experience came from another mother mentioning, "I think they may not like it if we ask everything... I can remember that I was not that happy to tell all... even though I didn't tell much to my parents I didn't do bad things... so I think we don't have to ask all about them, any way we need to trust our kids." Quality and quantity of monitoring practice depend on parents' own childhood experiences of how they were monitored by their parents.

iii. *Barriers Experienced in Monitoring their Adolescents*

Almost all parents addressed barriers that they have experienced while monitoring their adolescents. They highlighted that they are not doing the monitoring of their adolescents properly as they have experienced those barriers while in the process. Having a busy life schedule among parents was discussed as a barrier to

monitoring their adolescents during the discussion. A mother stated, "As I am a working mother, I have very little time to stay at home... actually, I do spend time even doing my work at home... that small-time period is much busier than my office time... I normally spent that short time helping my daughter to do her school homework". They shared experiences where responsibilities of monitoring are not being shared among fathers and mothers and parents are embarrassed about communicating with adolescents as barriers to continue quality parental monitoring. Statements made by the parents such as, "I think my wife should know all about my child..." and "I felt embarrassed in asking everything from my child... I mean about her friends all the time... I feel I am not that free for that" evidenced the above-mentioned themes respectively.

IV. DISCUSSION

A qualitative research approach, rooted through an exploratory and descriptive research design was selected for this study to allow parents to freely discuss and share their experiences and to explore parents' perceptions of the monitoring process. This design was suitable as the study explored the contextual elements and experiences of parents' journeys through the monitoring process of their school-going adolescent children, and provided comprehensive descriptions of parents' experiences of monitoring their adolescents' daily activities, their companions and whereabouts. This method helped to study it in-depth and gave opportunities for participants to come up with their feelings. Of the available qualitative methods, FGD was used in this study as it is commonly used in social and health research to explore the perspectives of participants (Tausch & Menold, 2016). The group functions by encouraging the participants to comment, explain, disagree, and share their views. Thus, experiences were shared, and opinions were voiced that might not surface during individual interviews (O.Nyumba et al., 2018; Tausch & Menold, 2016). Hence, although it takes more time and effort to organize focus groups, and they cause greater logistical problems than individual interviews do, FGDs might generate more ideas about, and yield deeper insights into, the problem under investigation (Coenen et al., 2012). In-depth interviews were not considered here as they will not facilitate coming up with their feelings and opinion with straight forwarded questioning where again reminding experiences is much easier with sharing with others. When recruiting participants, diversity in their socio-economic backgrounds was considered to optimize the results of the study. A purposive sampling method was adopted to secure an adequate representation of all three school types in the study. The maximum sample variation allowed the space to gather different types of information about this topic.

Four broader themes identified in the perception of parental monitoring were the parents' understanding of parental monitoring, expectations of parents in relation to adolescent lives, the role of sex on parental monitoring perception and perceived factors affecting the amount and the quality of parental monitoring done by parents.

Findings suggested that there be different understandings of parental monitoring among parents who participated in the study. Most parents were practicing it unintentionally. Some of them had no impression of the concept of parental monitoring but came out with activities that they were used to practice with their parenting roles which can be considered as monitoring their adolescent children unintentionally. Even though they behaved unintentionally, their aim was to reduce or prevent their adolescent kids from being involved in risk behaviors. This concludes that awareness about parental monitoring is rather a "grey area" that has not been established on its perfect understanding.

Parents had a perception that without parental monitoring their adolescents cannot achieve academic success and socially acceptable behaviors. Mostly these expectations were based on their own perception of prioritizing activities and thinking of the benefits, such as school academic work schedules and deciding on friends. However, parents generalized their perceptions on monitoring activities based on their expectations about age and sex appropriate and socially acceptable adolescent behaviors. Those expectations guide parental monitoring through enforcing rules and boundaries for adolescents' activities, whereabouts and companions. Parent's expectations have been raised as a theme in parental perception on monitoring practices with adolescent's free time use in a qualitative study done in Canada among parents (n=17) of adolescents aged 12-14 years using the interview methods. They also highlighted the expectations of parents are associated with establishing limits and control for adolescents' free time used for their activities. Once parents' parameters and expectations were covered, their adolescents were relatively free to behave under parents' guidelines (Hutchinson et al., 2003). However, this study covers monitoring of their adolescents on their expectations related to adolescent free time activities, the present study generally presents parents' perceived monitoring as one end result of their expectations.

The role of the sex of the adolescent child as well as the parents were identified as a theme that describes changes in parental monitoring perception of parents. Both mothers and fathers are perceived as mothers are mostly responsible for monitoring their adolescent children and without any opposition, many parents accepted that mothers do monitor their children as a routine practice than fathers. The same perception has been explored in a qualitative study done among 53

parents of adolescents aged 7-12 years through interviews with parents. This study revealed that mothers often function as monitors, keeping track of changing schedules (Deborah & Brenda, 2010). Parent's gender role differences were also estimated quantitatively, presenting that mothers are generally more engaged in their adolescents' lives to have a closer relationship than fathers (Finkenauer et al., 2002). The present study further suggests that there may be differences in parental monitoring according to the child's sex. Parents perceived that they are monitoring their sons more than their daughters with the reasoning that boys are more involved in risk behaviors than girls. In contrast to this finding, Deborah & Brenda (2010) found out, that parents perceived that they monitor their girls more than boys in their study. This gender role difference in parents' perception of parental monitoring has been estimated by many other quantitative studies as well. Even in their assessments of parental perception, they have shown that parents perceived high level of parental monitoring about their girls than their boys (Chilcoat et al., 1996; Crouter et al., 1999; Richards et al., 2004) in contrast to the present study finding.

While exploring parental perception of monitoring, parents came out with many facts covering the theme of factors related to the quality of parental monitoring practice of parents. Of them, parent-adolescent relationships, parent-adolescent communication and trust were identified as factors that improve parental monitoring quality. Parents who participated had the perception that as they have high levels of the above qualities, they can practice a high level of parental monitoring. Deborah & Brenda (2010) also revealed that adolescent disclosure affects parental perception of monitoring which can be considered in line with parent-adolescent relationship factors revealed in the present study. Furthermore, they came with some other different factors, such as; parents' strategies for coping with adolescents, parental anxiety and parental morals as factors that change parents monitoring practice, which was not revealed in the present study.

Parents often described their experiences of an event or events and authors were able to combine those facts and emotions into a larger concept during analysis. Parents came along with different methods that they were using to know their adolescent child's whereabouts, activities and companions in different frequencies. The most commonly reported strategy was having good communication with the child. This came as events that parents experienced with adolescent self-disclosure by adolescents freely telling things about them as well as solicitation by directly asking questions about activities. Parents of the present study experienced both concepts together as a common strategy in parental monitoring. Furthermore, parents have experienced that only if they solicit information from adolescents, they may experience adolescent

disclosure. So, parents highlighted two-way communication as an important strategy. Adolescent disclosure and parental solicitation have been frequently documented in the existing literature as two separate strategies. Disclosure has been connected with parental monitoring and subsequent incidences of risk behaviors (Margret et al., 2010). Crouter et al, revealed that mothers and fathers can sometimes rely on different sources for monitoring, such as disclosure and solicitation (Crouter et al., 2016). Even though good communication between parents and adolescents has been proven to function as a factor to obtain a high level of parental monitoring, the present study explored it as a parental monitoring strategy that parents experienced.

The method of monitoring through obtaining information from the kid's friends and their parents was similarly explored in a qualitative study done through FGDs conducted with Sri Lankan adolescents while studying parental engagement in adolescents' alcohol use, revealing that some parents agreed that they ask their adolescent's friends about things related to their child (Thanuja D.K., 2017). Further, this was comparatively similar to finding in (Bourdeau et al., 2011), in which they described similar strategies used to increase knowledge about their adolescent's friends. They obtained information from adolescents (direct interactions) as well as directly obtaining information from friends of adolescents who have been revealed in that qualitative study done among 173 parents of adolescents aiming to explore parental strategies for knowledge of adolescents' friends. Occasionally parents of that study have revealed obtaining information from parents of adolescent's friends as another strategy. Contacting parents of friends has been described there as a second-hand source of parental monitoring (Bourdeau et al., 2011). In contrast to these findings, in some studies parents were revealed to have obtained information on their adolescent's teachers as well as which was not a strategy that came from the parents of the present study (Crouter & Bumpus, 2001). Another strategy of monitoring practice identified in the intended study is by controlling their adolescent's activities and adding rules and regulations to their relationship with friends and whereabouts. Similarly, this has been explored as an important parental monitoring strategy while describing parental engagement in alcohol use among adolescents in Sri Lanka even though the study assessed the perception of adolescents (Rendle, et al 2019). Also, parental control has been identified to obtain information to prevent risk behaviors of adolescents, according to the qualitative analysis done among parents of adolescents in a rural area of the UK (Jigsaw, 2012).

Parents described their monitoring methods as reflecting on their past experiences and recalling their childhood experiences of being monitored by their parents. Many of the parents recalled their childhood

experiences of being monitored came with positive feedback on monitoring outcomes and monitoring activities of parents may vary according to their own childhood experiences of parents. This fact was not revealed in existing literature, hence, cannot be compared.

The barriers that parents identified were parents working hours and schedules, the financial instability of the family and having a resistant adolescent who may create issues when trying to elicit information from them. Parents had to think about their routine again and again when describing experiences on parental monitoring. As this was the first study in Sri Lanka to explore this concept, the results of the present study cannot be compared. Deborah & Brenda (2010) presented their longitudinal quantitative study that seeks to identify barriers to practice quality parental monitoring among a cohort of working mothers. Their discussion explored as having different psychopathologies such as depression or stress and having self-regulation on relationships with adolescents make parents difficult to practice effective and quality parental monitoring of their adolescents. Maternal depression and being socially disadvantaged families with a poor academic status of parents and having low family income has shown as barriers to effective parental monitoring quantitatively by Chilcoat et al., 1996. This finding was hardly highlighted during the present study.

The findings from the current exploratory study are of relevance to professionals working with parents and adolescents in the fields who are acting towards reducing the risk behavior involvement of adolescents. Hence, improvement of awareness of parental monitoring and its practice among parents is recommended to be incorporated into the parenting programs as an important component in improving parent-adolescent relationships and especially as a strategy to prevent adolescent risk behaviors. Researchers may also plan to further investigate the influence of parental monitoring on adolescents' risk behavior involvement, raised by our incidental findings. Thus, exploring the ability of parental monitoring towards improving the parent-adolescent relationship and communication, which would ultimately lead to improving the well-being of adolescents.

V. CONCLUSION

A variation in parents' understanding and their attitudes about monitoring their adolescent child and different strategies used in monitoring by parents were noted, highlighting the use of monitoring strategy in minimizing adolescent involvement in risk behaviors by parents. Being a family-based cultural context, parental monitoring can be used as one important intervention in improving parent-adolescent relationships and communication as well as minimizing risk behavior

involvement in Sri Lanka, during the efforts targeting healthier adolescence.

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Contributors

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Competing Interests

The authors declare that there are no competing interests to declare.

Ethics Declarations

Ethical approval was obtained from the Ethical Review Committee, Faculty of Medicine, University of Peradeniya, Sri Lanka (Research Project No.2019/EC/28). The authors affirm having followed professional ethical guidelines in preparing this work. These guidelines include obtaining informed consent from participants, maintaining ethical treatment and respect for the rights of participants, and ensuring the privacy and confidentiality of participants and their data, such as ensuring that individual participants cannot be identified in reported results or from publicly available original or archival data.

Data availability statement

Data are available on reasonable request.

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Development of a Model for Prediction of Composition and the Atomic Weights of the Elements

By Elcio Fabio Soares Pereira

Federal University of Minas Gerais

Abstract- Initially, a summary of the three works recently published by the author was presented, emphasizing aspects related to the topic addressed in this article.

Considering that proteins are the “fundamental particles” of all living biological beings and that atoms are the fundamental particles of all matter existing in the universe, the author had the intuition that the DNA code was created in the molds of a pre-existing universal code, hence the idea that the universal code, that is, the code of atoms, was similar to the code of DNA.

Based on these assumptions, he developed a model similar to the DNA genetic code model for predicting the composition and atomic weights of atoms.

Keywords: modeling, simulation, composition, atomic weight.

GJMR-K Classification: DDC Code: 541.26 LCC Code: QD461



DEVELOPMENT OF A MODEL FOR PREDICTION OF COMPOSITION AND THE ATOMIC WEIGHTS OF THE ELEMENTS

Strictly as per the compliance and regulations of:



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Development of a Model for Prediction of Composition and the Atomic Weights of the Elements

Desenvolvimento De Um Modelo Para Predição Da Composição E Dos Pesos Atômicos Dos Elementos

Elcio Fabio Soares Pereira

Resumo- Inicialmente apresentou-se um resumo dos três trabalhos recentemente publicados pelo autor, enfatizando aspectos ligados ao tema abordado neste artigo.

Considerando serem as proteínas as “partículas fundamentais” de todos os seres biológicos vivos e de serem os átomos as partículas fundamentais de toda matéria existente no universo, teve o autor a intuição de ter sido o código do DNA criado nos moldes de um código universal pré-existente, surgindo daí a idéia de que o código universal, ou seja, o código dos átomos fosse similar ao código do DNA.

Baseado nessas suposições, desenvolveu um modelo similar ao modelo do código genético do DNA, para a predição da composição e dos pesos atômicos dos átomos. Simulações feitas considerando-se os elementos da Tabela Periódica parecem confirmar o modelo desenvolvido pelo autor.

Os átomos gerados pelo modelo, chamados de “átomos genéticos”, gerados dos grupos genéticos atuantes, permitem a predição da composição subatômica dos diversos elementos da Tabela Periódica, a possibilidade da existência de inúmeros isótopos não assinalados e fornece uma possível explicação para a tantas partículas subatômicas.

Caso o modelo seja confirmado, novas questões são suscitadas, sendo algumas citadas pelo autor.

Palavras-chave: modelamento, simulação, composição, peso atômico.

Abstract- Initially, a summary of the three works recently published by the author was presented, emphasizing aspects related to the topic addressed in this article.

Considering that proteins are the “fundamental particles” of all living biological beings and that atoms are the fundamental particles of all matter existing in the universe, the author had the intuition that the DNA code was created in the molds of a pre-existing universal code, hence the idea that the universal code, that is, the code of atoms, was similar to the code of DNA.

Based on these assumptions, he developed a model similar to the DNA genetic code model for predicting the composition and atomic weights of atoms.

Simulations made considering the elements of the Periodic Table seem to confirm the model developed by the

author. The atoms generated by the model, called “genetic atoms”, generated from the active genetic groups, allow the prediction of the subatomic composition of the various elements of the Periodic Table, the possibility of the existence of numerous unmarked isotopes and provides a possible explanation for so many particles.

If the model is confirmed, new questions are raised, some of which are cited by the author.

Keywords: modeling, simulation, composition, atomic weight.

I. INTRODUÇÃO

Antes de focar o tema deste trabalho e para esclarecer como se chegou à abordagem original que será feita, são apresentadas resumidamente as hipóteses sugeridas nos três trabalhos anteriores do autor que o levaram à formulação do modelo que será apresentado.

No primeiro trabalho (1), considerou-se que a consciência emerge, nos seres biológicos, da complexidade da estrutura cerebral e que esta, a consciência, é tanto maior quanto mais complexa a estrutura do sistema que a suporta.

A suposição de que toda estrutura a partir de certa complexidade pode gerar uma consciência, torna passível admitir-se a existência de uma consciência universal que, tendo aspectos similares à consciência humana, poderia ser um possível elo comum entre o ser humano e o universo. Como consequência, um maior conhecimento da consciência humana implica num maior conhecimento do universo.

No segundo trabalho (2), apresenta argumentos que reforçam o caráter evolutivo do universo, mostrando parecer existir uma similaridade entre ondas eletromagnéticas e neurônios e entre sinapses e ressonâncias de Poincaré que, existindo, reforçariam a similaridade proposta entre a consciência humana (biológica) e a universal (não biológica).

Finalmente no terceiro trabalho (3), tecendo considerações sobre como poderia ser formada a consciência humana e pela similaridade entre a estrutura cerebral e a do universo, conclui pela possibilidade da emergência de uma consciência não-

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biológica (consciência do universo), similar à consciência humana.

A admissão da pré-existência de uma consciência do universo e a suposição desta como modelo para a evolução da consciência humana sugere a possibilidade da existência de um código universal, desde que o código genético do DNA tenha evoluído deste código pré-existente.

II. CÓDIGO DOS ÁTOMOS – DESENVOLVIMENTO DO MODELO

Após as considerações feitas na Introdução, o que primeiro chamou a atenção do autor foram os fatos de as proteínas serem as “partículas fundamentais” de todos os organismos vivos e de serem os átomos as partículas fundamentais de toda matéria existente no universo.

Na sequência, surgiu a intuição de considerar-se que, supondo ter sido o código do DNA criado nos moldes de um código universal pré-existente, talvez este código pré-existente pudesse ser similar ao código do DNA.

O código do DNA é formado pelas unidades básicas nitrogenadas constituídas pelos nucleotídeos, que são as quatro letras que compõem os aminoácidos (palavras), que formam as proteínas (frases), as constituintes fundamentais de todos os seres vivos.

Similarmente, considerou-se as partículas subatômicas como “nucleotídeos”, que seriam então as quatro letras que comporiam os “aminoácidos”

atômicos (palavras), que formariam as “proteínas” atômicas, átomos, os constituintes fundamentais de toda matéria existente no universo. No código do DNA, a cadeia polipeptídica é formada pela junção do grupamento de quatro letras (aminoácidos) com os genes carregados pelo RNA mensageiro, que após formada dobra-se para formar a proteína.

Assim como as quatro letras são agrupadas em grupos de três letras (as palavras) no código do DNA, também foram agrupadas as quatro partículas subatômicas (letras) em grupamentos de três (palavras), por serem as partículas subatômicas classificadas em três famílias. Similarmente, a este grupamento de três partículas subatômicas são juntados um próton e um ou dois quarks, necessários para a neutralidade elétrica do conjunto final de partículas subatômicas. Pode-se imaginar estes quarks com um próton (também constituído de três quarks) como se fossem os genes levados por um RNA mensageiro para juntar-se ao grupamento de três partículas subatômicas para formar o átomo completo, que agora será denominado como um “átomo genético”. Aos grupamentos de três partículas subatômicas foi dado o nome de “grupo genético”.

Os grupos genéticos são formados pela combinação de 4 letras (quatro partículas subatômicas) grupadas três a três.

Mostra-se na Tabela 1 as letras associadas às partículas subatômicas.

Tabela 1: Letras associadas às partículas subatômicas

PARTÍCULAS SUBATÔMICAS	LETRAS
Elétron	e
Neutrino do elétron	n
Quark up	u
Quark down	d
Múon	M
Neutrino do múon	m
Quark charm	c
Quark strange	s
Tau	T
Neutrino do tau	t
Quark top	p
Quark botton	b

Fonte: Autor, 2022

A Tabela 2 mostra valores das massas e cargas elétricas das partículas subatômicas das três famílias.

Tabela 2: Valores das massas e cargas das partículas subatômicas das três famílias.

PARTÍCULA SUBATÔMICA	MASSA	CARGA ELÉTRICA
FAMÍLIA 1		
e	0,00054	-1
n	<10 ⁻⁸	0
u	0,0047	2/3
d	0,0074	-1/3
FAMÍLIA 2		
M	0,11	-1
m	<0,003	0
c	1,6	2/3
s	0,16	-1/3
FAMÍLIA 3		
T	1,9	-1
t	-0,033	0
p	189	2/3
b	5,2	-1/3

Massas em múltiplos da massa do próton. Fonte: Referência (4), p. 24

A matriz da Figura 1 mostra o resultado das combinações das quatro partículas subatômicas em grupamentos três a três.

FAMÍLIA 2						
		M	m	c	s	
FAMÍLIA 1	e	eMT	emT	ecT	esT	T
		eMt	emt	ect	est	t
		eMp	emp	ecp	esp	p
		eMb	emb	ecb	esb	b
	n	nMT	nmT	ncT	nsT	T
		nMt	nmt	nct	nst	t
		nMp	nmp	ncp	nsp	p
		nMb	nmb	ncb	nsb	b
	u	uMT	umT	ucT	usT	T
		uMt	umt	uct	ust	t
		uMp	ump	ucp	usp	p
		uMb	umb	ucb	usb	b
d	dMT	dmT	dcT	dsT	T	
	dMt	dmt	dct	dst	t	
	dMp	dmp	dcp	dsp	p	
	dMb	dmb	dcb	dsb	b	
						FAMÍLIA 3

Fonte: Autor, 2022

Figura 1: Mostra o resultado das combinações das quatro partículas subatômicas em grupamentos três a três.

Na Figura 2 mostra-se a mesma matriz, com a simplificação de não se admitir num mesmo grupo genético duas partículas subatômicas com duas e sem nenhuma força eletromagnética (elétron, múon e tau).

Pode ser observado da Figura 2 que, com a simplificação, das 64 possibilidades de obtenção dos grupos genéticos restaram apenas 27 grupos. Só como comparação, no caso do código genético do DNA humano, das 64 bases nitrogenadas de possíveis aminoácidos formados com as quatro letras do código genético, apenas 19 existem.

FAMILIA 2						
		M	m	c	s	
FAMILIA 1	e		emt	ect	est	T
			emp	ecp	esp	t
			emb	ecb	esb	p
	n		nmT	ncT	nsT	b
		nMt				T
		nMp				t
	u		umT	ucT	usT	p
		uMt				b
		uMp				T
	d		dmT	dcT	dsT	t
		dMt				p
		dMp				b
		dMb			T	
					t	
					p	
					b	

Fonte: Autor, 2022

Figura 2: Mostra o resultado das combinações das quatro partículas subatômicas em grupamentos três a três, com a simplificação de não se admitir num mesmo grupo genético duas partículas subatômicas com duas ou nenhuma força eletro-magnética (elétron, múon e tau).

A Tabela 3 mostra os resultados das massas e das cargas elétricas para alguns grupos genéticos, suas cargas resultantes da adição de um próton e os possíveis quarks ou grupos de quarks necessários para zerar suas cargas após a adição de um próton ao grupo genético, usando-se os dados da Tabela 2.

Deve ser realçado que, quando o valor indicado é precedido do símbolo "menor que", foram considerados em todos os cálculos os valores indicados desconsiderando-se estes símbolos.

Tabela 3: Valores das massas e das cargas elétricas para alguns grupos genéticos e possíveis quarks necessários para zerar suas cargas com um próton.

GRUPOS GENÉTICOS	MASSA	CARGA ELÉTRICA	CARGA ELÉTRICA COM 1 PRÓTON	GRUPOS POSSÍVEIS DE QUARKS PARA ZERAR CARGA COM 1 PRÓTON
nsT	<2,06	-4/3	-1/3	ud, us, ub, cd, cs, cb, pd, ps, pb
usT	2,06	-2/3	1/3	d, s, b
dmT	<1,91	-4/3	-1/3	ud, us, ub, cd, cs, cb, pd, ps, pb
nmT	<1,90	-1	0	
dsT	2,07	-2/3	1/3	d, s, b
esT	<0,19	-4/3	-1/3	ud, us, ub, cd, cs, cb, pd, ps, pb
PRÓTON 2ud	0,02	+1		

Massas em múltiplos da massa de um próton. Fonte: Autor, 2022

III. METODOLOGIA

Foi adotada a seguinte metodologia para gerar os átomos genéticos:

- Para cada elemento da Tabela Periódica, junta-se a um determinado grupo genético um próton com um ou dois quarks, de tal modo que a carga elétrica do átomo genético gerado seja zero. Convém realçar que existem várias combinações possíveis de quarks como mostrado na Tabela 3, sendo escolhida a que melhor se ajusta ao peso atômico experimental dado pela Tabela Periódica. Não é

necessário utilizar-se do peso atômico dado pela Tabela Periódica para o cálculo do peso atômico do átomo genético. O cálculo do peso atômico do átomo genético é feito multiplicando-se a soma dos pesos atômicos das partículas subatômicas constituintes pelo número atômico.

Como exemplo considere-se o cálculo para o Lítio, peso atômico 6,94 e número atômico 3.

Os grupos genéticos compatíveis são: nsT e usT, com cargas elétricas de -4/3 e 1/3 respectivamente. O próton (2u d), tem carga -1 e os quarks necessários para zerar a carga elétrica dos

átomos genéticos são respectivamente us e s , escolhidos para satisfazerem ao critério de serem as massas dos átomos genéticos resultantes compatíveis com as massas do elemento sendo focado.

Resumindo, a constituição final do átomo genético pode ser: $nsT\ 2u\ d\ us$ ou $usT\ 2u\ d\ s$.

Feitos os cálculos, o erro com relação ao valor experimental do peso atômico para o Lítio foi de -3% em ambos os casos. Estes cálculos são mostrados na Tabela 4, que mostra resultados para os Metais Alcalinos e Alcalinos Terrosos.

IV. RESULTADOS E CONCLUSÕES

As Tabelas 4 a 7 mostram os resultados calculados para os 10 grupos da Tabela Periódica. São mostrados somente valores calculados para átomos genéticos que satisfizeram aos critérios para a geração dos mesmos, ou seja, carga elétrica zero e compatibilidade com os pesos atômicos dos elementos considerados. Para alguns dos grupos da Tabela Periódica são mostrados apenas alguns dos elementos do grupo, escolhidos aleatoriamente.

Examinando-se estas Tabelas, nota-se:

- Que apenas foram utilizados os grupos genéticos mostrados na Tabela 3 para a geração dos átomos genéticos de todos os elementos existentes na Tabela Periódica e que os grupos genéticos que mais foram utilizados são os quatro da coluna "s" da Figura 2, sendo o grupo genético "est" utilizado apenas para o Não Metal H.
- Os grupos genéticos "nmT" e "dmT" da coluna "m" da Figura 2 parece serem necessários apenas para alguns elementos com vários isótopos, como por exemplo cálcio, Magnésio, Boro e Silício. O grupo genético "dsT" parece ser o único utilizado na geração dos átomos constituintes dos Actinídeos.
- Tem-se então que, dos 64 grupos genéticos possíveis são utilizados apenas 06, acrescidos do próton. No caso do código genético do DNA, dos 64 amino-ácidos possíveis, apenas 19 existem. Permanece sem resposta a utilidade dos demais grupos genéticos não utilizados. Poderiam alguns deles constituírem, por exemplo, a matéria escura existente no universo?
- Os resultados das Tabelas 4 a 7 também sugerem a existência de isótopos para alguns metais como por exemplo para o potássio, Berilo, Magnésio e alguns outros, para os quais não há indicação na Tabela Periódica.
- Observa-se que para todos os grupos de metais da Tabela Periódica, o erro percentual com relação aos valores obtidos experimentalmente cresce com o número atômico.
- Observou-se também que todos átomos genéticos contém 6 quarks computando-se os três quarks do próton. A única exceção notada foi para o não

metal hidrogênio. Segundo a constituição atômica mostrada pelo modelo, o ytrio, deutério e trítio, possuem respectivamente 4, 5 e 6 quarks.

- De um modo geral, tendo-se em vista os erros quando se confrontam os valores calculados dos pesos atômicos com as composições dos átomos genéticos com os valores experimentais dados pela Tabela Periódica, parece viável concluir-se pela validade do código (modelo) proposto para geração dos átomos que compõem toda matéria do universo. Chama atenção o caso do Não Metal Hidrogênio, para o qual os erros para os três tipos: sem nêutron, com um e com dois nêutrons, diferiram bastante dos valores experimentais dados pela Tabela Periódica. Vide Tabela 5.

O modelo proposto parece explicar a utilidade de um número tão grande de partículas fundamentais, gerando ao mesmo tempo novas questões.

Admitindo-se, como parece demonstrado pelo modelo proposto, que o código do DNA tenha sido copiado do código dos átomos proposto e considerando a possibilidade do mesmo ter sido utilizado por seres biológicos primitivos para sua evolução, como teriam as informações deste código sido passadas aos seres biológicos primitivos que ainda não possuíam cérebro? Ou teria o código do DNA evoluído independentemente do código atômico proposto?

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Tabela 4: Resultados dos pesos atômicos calculados dos átomos genéticos para os elementos dos grupos dos metais alcalinos e alcalinos terrosos.

GRUPOS DE METAIS	ELEMENTOS	COMPOSIÇÃO ATÔMICA COM PRÓTONS E NÉUTRONS	MASSA (1)	NÚMERO ATÔMICO Z (2)	PESO ATÔMICO CALCULADO $O_{Pc} (1) \times (2)$	PESO ATÔMICO TABELADO Pt	ERRO (Pc - Pt/Pt) %	
M E T A I S A L C A L I N O S	Li	nsT 2ud us	2,24	3	6,72	6,94	-3	
		usT 2ud s	2,24	3	6,72	6,94	-3	
	Na	nsT 2ud ud	2,09	11	22,99	22,99	0	
		usT 2ud d	2,09	11	22,99	22,99	0	
	K	nsT 2ud ud	2,09	19	39,71	39,098	2	
		usT 2ud d	2,09	19	39,71	39,098	2	
	Rb	nsT 2ud us	2,24	37	82,88	85,468	-3	
		usT 2ud s	2,24	37	82,88	85,468	-3	
	Cs	nsT 2ud us	2,24	55	123,20	132,91	-7	
		usT 2ud s	2,24	55	123,20	132,91	-7	
	Fr	nsT 2ud us	2,24	87	194,88	223	-13	
		usT 2ud s	2,24	87	194,88	223	-13	
	M E T A I S A L C A L I N O S T E R R O S O S	Ca	nsT 2ud ud	2,09	20	41,80	40,078	4
			usT 2ud d	2,09	20	41,80	40,078	4
dmT 2ud us			2,09	20	41,80	40,078	4	
nmT 2ud			1,92	20	38,40	40,078	-4	
Be		nsT 2ud us	2,24	4	8,96	9,0122	-1	
		usT 2ud s	2,24	4	8,96	9,0122	-1	
Mg		nsT 2ud ud	2,09	12	25,08	24,305	3	
		usT 2ud d	2,09	12	25,08	24,305	3	
		dmT 2ud us	2,09	12	25,08	24,305	3	
Sr		nsT 2ud us	2,24	38	85,12	87,62	-3	
		usT 2ud s	2,24	38	85,12	87,62	-3	
Ba		nsT 2ud us	2,24	56	125,44	137,33	-9	
		usT 2ud s	2,24	56	125,44	137,33	-9	
Ra		nsT 2ud us	2,24	88	197,12	226	-13	
	usT 2ud s	2,24	88	197,12	226	-13		

Fonte: Autor, 2022.

Tabela 5: Resultados dos pesos atômicos calculados dos átomos genéticos para os elementos dos grupos gases nobres, halogênios e não metal.

GRUPOS DE METAIS	ELEMENTOS	COMPOSIÇÃO ATÔMICA COM PRÓTONS E NÉUTRONS	MASSA (1)	NÚMERO ATÔMICO Z (2)	PESO ATÔMICO CALCULAD O Pc (1)x(2)	PESO ATÔMICO TABELADO Pt	ERRO (Pc - Pt)/Pt %	
G A S E S N O B R E S	He	nsT 2ud ud	2,09	2	4,18	4,0026	4	
		usT 2ud d	2,09	2	4,18	4,0026	4	
	Ne	nsT 2ud ud	2,09	10	20,90	20,18	4	
		usT 2ud d	2,09	10	22,90	20,18	4	
	Ar	usT 2ud s	2,24	18	40,32	39,948	1	
		nsT 2ud us	2,24	18	40,32	39,948	1	
	Kr	nsT 2ud us	2,24	36	80,64	83,798	-4	
		usT 2ud s	2,24	36	80,64	83,798	-4	
	Xe	nsT 2ud us	2,24	54	120,96	131,29	-8	
		usT 2ud s	2,24	54	120,96	131,29	-8	
	Rn	nsT 2ud us	2,24	86	192,64	222	-13	
		usT 2ud s	2,24	86	192,64	222	-13	
	Og	nsT 2ud us	2,24	118	264,32	294	-10	
		usT 2ud s	2,24	118	264,32	294	-10	
	H A L O G Ê N I O S	Cl	nsT 2ud ud	2,09	17	35,53	35,45	2
			usT 2ud d	2,09	17	35,53	35,45	2
		F	nsT 2ud ud	2,09	9	18,81	18,998	-1
			usT 2ud d	2,09	9	18,81	18,998	-1
Br		nsT 2ud us	2,24	35	78,40	79,904	-2	
		usT 2ud s	2,24	35	78,40	79,904	-2	
I		nsT 2ud us	2,24	53	118,72	126,90	-6	
		usT 2ud s	2,24	53	118,72	126,90	-6	
At		nsT 2ud us	2,24	85	190,40	210	-9	
		usT 2ud s	2,24	85	190,40	210	-9	
Ts		nsT 2ud us	2,24	117	262,08	294	-11	
		usT 2ud s	2,24	117	262,08	294	-11	

NÃO METAL	H	est 2ud	0,21	1	0,21	1,008	-79
		est 2ud s	0,37	1	0,37	2,014	-82
		est 2ud us	0,53	1	0,53	3,022	-82

Fonte: Autor, 2022.

Tabela 6: Resultados dos pesos atômicos calculados dos átomos genéticos para os elementos dos grupos semimetais e actinídeos.

GRUPOS DE METAIS	ELEMENTOS	COMPOSIÇÃO ATÔMICA COM PRÓTONS E NÊUTRONS	MASSA (1)	NÚMERO ATÔMICO Z (2)	PESO ATÔMICO CALCULADO O Pc (1)x(2)	PESO ATÔMICO TABELADO Pt	ERRO (Pc - Pt/Pt) %	
SEMIMETAIS	B	nsT 2ud us	2,24	5	11,20	10,81	4	
		usT 2ud s	2,24	5	11,20	10,81	4	
		nsT 2ud ud	2,09	5	10,45	10,81	3	
		usT 2ud d	2,09	5	10,45	10,81	3	
		dmT 2ud us	2,09	5	10,45	10,81	3	
	Si	dmT 2ud ud	1,94	14	27,16	28,085	-3	
		nsT 2ud ud	2,09	14	29,26	28,085	4	
		usT 2ud d	2,09	14	29,26	28,085	4	
		dmT 2ud us	2,09	14	29,26	28,085	4	
	As	nsT 2ud us	2,24	33	73,92	74,922	-1	
		usT 2ud s	2,24	33	73,92	74,922	-1	
	Sb	nsT 2ud us	2,24	51	114,48	121,76	-6	
		usT 2ud s	2,24	51	114,48	121,76	-6	
	Te	nsT 2ud us	2,24	52	116,48	127,60 (3)	-9	
		usT 2ud s	2,24	52	116,48	127,60 (3)	-9	
		dsT 2ud us	2,25	52	117,00	127,60 (3)	-8	
	Po	nsT 2ud us	2,24	84	188,16	209	-10	
		usT 2ud s	2,24	84	188,16	209	-10	
	ACTINÍDEOS	Ac	dsT 2ud us	2,25	89	200,25	227	-12
		Pa	dsT 2ud us	2,25	91	204,75	231,04	-11
U		dsT 2ud us	2,25	92	207,00	238,03	-13	
Np		dsT 2ud us	2,25	93	209,25	237	-12	
Pu		dsT 2ud us	2,25	94	211,50	244	-13	
Md		dsT 2ud us	2,25	101	227,25	258	-12	
No		dsT 2ud us	2,25	102	229,50	259	-11	
Lr		dsT 2ud us	2,25	103	231,75	262	-12	

Fonte: Autor, 2022.

Tabela 7: Resultados dos pesos atômicos calculados dos átomos genéticos para os elementos dos grupos outros metais, metais de transição e lantanídeos.

GRUPOS DE METAIS	ELEMENTOS	COMPOSIÇÃO ATÔMICA COM PRÓTONS E NÉUTRONS	MASSA (1)	NÚMERO ATÔMICO Z (2)	PESO ATÔMICO CALCULADO $P_c (1) \times (2)$	PESO ATÔMICO TABELADO P_t	ERRO $(P_c - P_t/P_t) \%$	
OUTROS METAIS	Al	nsT 2ud ud	2,09	13	27,17	26,982	1	
		usT 2ud d	2,09	13	27,17	26,982	1	
		dmT 2ud us	2,09	13	27,17	26,982	1	
	Ga	nsT 2ud us	2,24	31	69,44	69,723	-0,4	
		usT 2ud s	2,24	31	69,44	69,723	-0,4	
	In	nsT 2ud us	2,24	49	109,76	114,82	-4	
		usT 2ud s	2,24	49	109,76	114,82	-4	
	Lv	nsT 2ud us	2,24	116	259,84	293	-11	
		usT 2ud s	2,24	116	259,84	293	-11	
	METAIS DE TRANSIÇÃO	Sc	nsT 2ud ud	2,09	21	43,89	44,956	-2
			usT 2ud d	2,09	21	43,89	44,956	-2
			dmT 2ud us	2,09	21	43,89	44,956	-2
Ti		nsT 2ud us	2,24	22	49,28	47,867	3	
		usT 2ud s	2,24	22	49,28	47,867	3	
Ni		nsT 2ud ud	2,09	28	58,52	58,699	-0,3	
		usT 2ud d	2,09	28	58,52	58,699	-0,3	
		dmT 2ud us	2,09	28	58,52	58,699	-0,3	
W		nsT 2ud us	2,24	74	165,76	183,84	-10	
		usT 2ud s	2,24	74	165,76	183,84	-10	
		dsT 2ud us	2,25	74	166,50	183,84	-9	
Cn		dsT 2ud us	2,25	112	252,00	285	-12	
LANTANÍDEOS	La	nsT 2ud us	2,24	57	127,68	138,91	-8	
		usT 2ud s	2,24	57	127,68	138,91	-8	
	Gd	nsT 2ud us	2,24	64	143,36	157,25 (3)	-9	
		usT 2ud s	2,24	64	143,36	157,25 (3)	-9	
		dsT 2ud us	2,25	64	144,00	157,25 (3)	-8	
	Sm	dsT 2ud us	2,25	62	139,50	150,36	-7	

Fonte: Autor, 2022.

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Dispersion of Multidrug Resistant Bacteria and Fecal Bacteria into Field Soils of Japan through Compost Application

By Katsuji Watanabe

Abstract- As huge amount of organic fertilizer of fecal origin has annually been dispersed into field soils without checking included hazardous bacteria. In order to estimate their contamination level in Japanese field soils, MRB and fecal bacteria in nine composts, which had originated from cattle feces, pig feces, and chicken droppings and been applied on soils for organic farms in various regions of Japan, were evaluated by using an originally developed analysis method. The tested composts included higher number of general bacteria (from 7.08×10^9 MNP g⁻¹ dry matter to 316.2×10^9 MNP g⁻¹), where gram-positive bacterial groups, such as Actinobacteria, Bacillus sp., and Staphylococcus sp., and the other Firmicutes were the numerical dominant in most of them (22% to 98%). Six out of nine composts included over the detection limit of MRB, which proliferated under mixture of 25ppm each of streptomycin, chloramphenicol, and ampicillin (1×10^4 MPN g⁻¹ dry matter to 84.9×10^4 MPN g⁻¹), where gram-negative MBR were the numerically dominant (33.3% to 100%). As most of the composts included not only fecal bacteria and pathogenic bacteria but also MRB of fecal origin such as Bacteroides sp., B. coprocola, and Borrelia recurrent, large area of Japanese field soils were suggested to be contaminated with such the fecal bacteria through application of compost.

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DISPERSION OF MULTIDRUG RESISTANT BACTERIA AND FECAL BACTERIA INTO FIELD SOILS OF JAPAN THROUGH COMPOST APPLICATION

Strictly as per the compliance and regulations of:



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Dispersion of Multidrug Resistant Bacteria and Fecal Bacteria into Field Soils of Japan through Compost Application

Dispersion of Hazardous Bacteria

Katsuji Watanabe

Abstract- As huge amount of organic fertilizer of fecal origin has annually been dispersed into field soils without checking included hazardous bacteria. In order to estimate their contamination level in Japanese field soils, MRB and fecal bacteria in nine composts, which had originated from cattle feces, pig feces, and chicken droppings and been applied on soils for organic farms in various regions of Japan, were evaluated by using an originally developed analysis method. The tested composts included higher number of general bacteria (from 7.08×10^9 MNP g⁻¹ dry matter to 316.2×10^9 MNP g⁻¹), where gram-positive bacterial groups, such as Actinobacteria, Bacillus sp., and Staphylococcus sp., and the other Firmicutes were the numerical dominant in most of them (22% to 98%). Six out of nine composts included over the detection limit of MRB, which proliferated under mixture of 25ppm each of streptomycin, chloramphenicol, and ampicillin (1×10^4 MPN g⁻¹ dry matter to 84.9×10^4 MPN g⁻¹), where gram-negative MBR were the numerically dominant (33.3% to 100%). As most of the composts included not only fecal bacteria and pathogenic bacteria but also MRB of fecal origin such as Bacteroides sp., B.coprocola, and Borrelia recurrent, large area of Japanese field soils were suggested to be contaminated with such the fecal bacteria through application of compost. Correlation analyses of each bacterial numbers suggested that most of MRB might have survived against the thermophilic phase in the composting process and could have been eliminated by regulating thermophilic phase.

Core ideas

- Higher ratio of composts for organic farmers included multidrug resistant bacteria (MRB).
- Higher ratio of composts for organic farmers included fecal bacteria and pathogenic bacteria.
- Numbers of MRB and thermotolerant bacteria in composts varied in reverse trend.
- MRB in composts might be eliminated by controlling an abiotic factor.
- The used method was effective to evaluate MRB and fecal bacteria in compost.

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I. INTRODUCTION

At present, almost all farmers have been encouraged to spread organic fertilizer into field soil under a government policy to improve soil fertility and maintain field conditions (FAO 2018; Rayne and Aula 2020). The spreading of organic fertilizer into field soils has also been encouraged to reduce and to recycle organic wastes under social demand to construct sustainable societies in all over the world (Chatterjee et al., 2017, Sharma et al., 2019). As organic fertilizer originates from raw livestock feces which includes pathogenic bacteria (Gerba & Smith 2005) or multidrug resistant bacteria (MRB) (Agga et al., 2015; Looft et al., 2012), organic fertilizer application has a possibility to enhance contamination of such the hazardous bacteria to various environments (Smith et al., 2019; Watanabe 2008, 2009; Watanabe et al., 2008; Watanabe and Koga 2009; Watanabe et al., 2015a) and foods (Hölzel et al., 2018; Marti et al., 2013; Zekar et al., 2017; Zhang et al., 2019). Although fecal bacteria might be reduced during composting process, huge amount of organic fertilizer, which is made from livestock feces by various ways and includes various amount of such the hazardous bacteria, has annually been dispersed onto field soils without checking. In order to reduce their contamination to various environments and food, an appropriate method to check such hazardous bacteria in organic fertilizer is required before their application on field soil (Watanabe 2008, 2009; Watanabe et al., 2008; Watanabe and Koga 2009).

Whereas with respect to MBR, conventional surveillance method targeting specific nosocomial bacteria was not suitable, because the susceptibility tests and taxonomy determinations of isolates should be expanded broadly over various kinds of bacterial groups (Burgos et al., 2005; DebMandal et al., 2011; Ghosh. & LaPara 2007; Kilonzo-Nthenge et al., 2013; Oliver et al., 2020; Sawant et al., 2007, Yang et al., 2016; Young quist et al., 2016). Furthermore, un-culture-based molecular methods such as quantitative polymerase chain reaction (qPCR) and next generation sequencing (NGS) was also not suitable. Because the antibiotic resistant genes (ARGs) targeted by these methods were not intrinsic

virulence genes, such as the Vero toxin gene (Kudo et al., 2007), or the Shiga toxin gene (Parsons et al., 2016), which could differentiate pathogenic bacteria from the other harmless bacteria, but harmless genes, which were widely distributed into indigenous bacteria in natural environments (D'Costa et al., 2011; Nesme et al., 2014), and into natural mammalian intestines (Stanton et al., 2011; Zhang et al., 2011) before the modern selective pressure of clinical antibiotic use (D'Costa et al., 2011), and the hazard level of the samples could not be evaluated by the detection of ARGs.

MRB groups in the sample were found to be rapidly identified and quantified by analyzing the bacteria that proliferated under antibiotics (Watanabe et al., 2016). In this manuscript, each MRB group included in compost had been identified by multiple enzyme restriction fragment length polymorphism (MERFLP) (Watanabe et al., 2008; Watanabe & Koga 2009) and quantified by the most probable number method by using an originally developed method (Watanabe et al., 2015a, 2015b, 2016).

The author had explored MRB and fecal bacteria in nine composts that originated from diverse livestock feces and had annually been applied on soils of organic farms in various regions of Japan. The purposes of this experiment were 1) to speculate how widely MRBs and the other fecal bacteria had spread into the field soil of Japanese organic farms through compost application, 2) to know what kinds of MRB and fecal bacteria had introduced into field soil through compost application, and 3) to find out a way to reduce MRB and fecal bacteria during composting process. In order to speculate composting conditions of the tested composts, which might have affected the residual MRB and fecal bacteria, the composition and numbers of numerically dominant bacteria were also searched.

II. MATERIALS AND METHODS

a) Samples

The nine tested composts had been used on organic farms in various regions of Japan. Compost A, which was a marketable good originating from chicken droppings, has been applied on organic farm A in Nagano Prefecture in the Chubu region, where organic rice has been cultivated. Compost B, which was handmade from chicken droppings, has been applied on organic farm B in Niigata Prefecture in the Hokuriku region, where organic rice has been cultivated. Compost BB was a so-called "Bokashi-compost", which was a handmade from several kinds of organic waste through fermentation, and has also been applied on farm B, where organic rice has been cultivated. Compost C, which was a marketable good originating from pig feces, has been applied on organic farm C in Chiba Prefecture in the Kanto region, where organic vegetables have been cultivated. Compost D, which

was a marketable good originating from pig feces, has been applied on organic farm D in Ibaraki Prefecture in the Kanto region, where organic vegetable has been cultivated. Compost E, which was a marketable good made from cattle feces, has been applied on organic farm E in Fukushima Prefecture in the Tohoku region, where organic vegetables have been cultivated. Compost F1, F2, and F3, which were made from cattle feces by the National Agricultural Research Center for the Kyushu-Okinawa region in Kumamoto Prefecture in the Kyushu region, have been applied on experimental fields in the research center, where vegetables and rice have been cultivated. Although there was not such a large difference in the composting process among these three composts (Watanabe et al., 2015b), recycled paper was added to adjust the moisture content (60%) of the starting material in the composting process of compost F1, rice straw was added for composting to compost F2, and wood chips were added to compost F3.

b) MPN and used antibiotics

For analysis of general bacteria (B), serial 10-fold dilutions (10⁻⁸ to 10⁻¹²) prepared from samples (1g fresh wt.) were inoculated to centrifuge tubes (5 replicates) including an LB medium. After 5 days of incubation at 30°C, the bacterial DNA in each tube was extracted as described previously and purified by conventional methods (Watanabe et al., 2015a, 2015b). For analysis of MRB (M), the following antibiotics were simultaneously added to the LB medium: streptomycin (25 mg/l), chloramphenicol (25 mg/l), and ampicillin (25 mg/l). Serial 10-fold dilutions (10⁻⁴ to 10⁻⁷) prepared from samples (1g fresh wt.) were inoculated to centrifuge tubes (5 replicates) including an LB medium and the antibiotics. As the MRB detected by the method was bacteria that proliferated under a mixture of 25 ppm each of three antibiotics, they had higher resistance to those detected by conventional susceptibility tests such as the disk diffusion test, where the resistance of each antibiotic was separately tested. Until now, the MRB had been exceptionally detected in limited samples only, such as livestock feces, composts (Watanabe et al., 2016), feces applied to field soils, activated sludges, a few fresh meats, river water, and fresh vegetables (Watanabe unpublished results).

c) MERFLP of the amplified 16S rDNA

Using the V2 forward primer (41f), and the V6 reverse primer (1066r) (Weidner et al., 1996), 16S rDNA was amplified, as described previously (Watanabe et al., 2008). Their restriction fragment lengths were measured by microchip electrophoresis systems (MCE-202 MultiNA; Shimadzu Co., Ltd. Kyoto Japan) after digestion of the PCR product (10µl) using each restriction enzyme, HaeIII or HhaI or RsaI (10 units, Takara Bio Co. Ltd. Shiga Japan) in a buffer solution (10xLow salt buffer, Takara Bio Co. Ltd.) and 5 folds

dilution by de-ionized water, as described previously (Watanabe et al., 2015b, 2016).

d) *Reference database used for the phylogenetic estimation*

The reference database used for this research included 30,844 post-amplification sequence files of 16S rDNA amplified by 41f/1066r primers (Watanabe et al., 2016), which were mainly re-edited from small subunit rRNA files in the Ribosomal Database Project (RDP) II release 9_61 (Cole et al., 2007) under 5-bases mismatches in both primer annealing sites, and consisted of 1,379 bacterial genera, including uncultured and unidentified bacteria (Watanabe et al., 2016). From post-amplification sequence files, fragment size for each restriction enzyme was calculated and save in the restriction fragment database and used for similarity search as described previously (Watanabe et al., 2008; Watanabe and Koga 2009).

e) *Data processing to select homogenous 16S rDNA and phylogenetic estimation*

For precise phylogenetic estimation by MERFL, the measured MERFL originating from homogeneous 16S rDNAs had to be selected among the mixed MERFLs by data processing (Watanabe et al., 2015a, 2015b). Because all the reference MERFLs were calculated from the homogeneous 16S rDNA sequence in the RDP II database, while the measured MERFL was obtained by restriction digestions of a mixture of 16S rDNAs, which were amplified using DNAs from different bacteria in each MPN tube as described previously (Watanabe et al., 2015a, 2015b). The selected restriction fragments (RFs) with the highest relative mole concentrations (ratio of fluorescent intensity to fragment size) was summed up until to reach the 16S rDNA size before restriction digestion, which was treated as the major RFLP (represented as H in Table S1 and S2) originated from a the major homogenous 16S rDNA in a MPN vial. The 2nd major RFs (represented as M in Table S1 and S2), and the 3rd major RFs (represented as L in Table S1 and S2) were similarly selected as described in the former manuscript (Watanabe et al., 2015a, 2015b).

If the completely identical theoretical MERFL was not found out by using all the measured MERFL data, combinations of restriction enzymes used for the analysis was changed (Table 1, and Table 2) (Watanabe et al., 2015a, 2015b). Because measured RFs with near DNA length could not always be separated by electrophoresis, which resulted in lower similarity in similarity search for RFLP (Watanabe et al., 2015a, 2015b). As to the measured MERFL which had not completely identical theoretical MERFL, the theoretical MERFL having the highest similarity to the measured MERFL was indicated in Table 1 and Table 2.

f) *Enumeration of antibiotic resistant bacterial groups by MPN*

Based on the results of phylogenetic estimation, each 16S rDNA was differentiated into the following 12 groups: Actinobacteria (A), Bacillus group (bF), Staphylococcus sp. (sF), other Firmicutes (F), Sphingomonadaceae (sP), other α -Proteobacteria (aP), β -Proteobacteria (bP), γ -Proteobacteria (rP), δ -Proteobacteria (dP), ϵ -Proteobacteria (eP), Cytophaga (C), other bacteria (O), and unidentified or uncultured bacterial (U), as shown in Table S1 and Table S2. By using MPN score for each groups (Table 1 and Table 2) and a table for a five-tube and three-decimal-dilution experiment (Blodgett 2010), the MPN of each bacterial group and MRB group were estimated (Table 1, 2). Using the FDA's Bacterial Analytical Manual (Blodgett 2010), confidence limits were obtained and shown in Table 1 and Table 2.

III. RESULTS AND DISCUSSION

a) *Phylogenetic estimation and enumeration of general bacteria*

There was a large difference in the total bacteria numbers included in the tested composts (from 7.08×10^9 MNP g⁻¹ dry matter to 316.2×10^9 MNP g⁻¹) (Table 1), which were higher than those of the reported numbers by plate count (Rebollido et al., 2008; Vishan et al., 2014). Although there was no report of a bacterial number by the culture-independent method (Schloss et al., 2005), the higher bacterial numbers by the method might be caused by included unculturable bacteria (Watanabe et al., 2015b).

In composts originating from chicken droppings and pig feces (compost A, B, BB, C, and D), the major bacteria were gram-positive bacterial groups, such as Actinobacteria and Firmicutes, which occupied 79.7% to 98.3% of the total bacterial number when unidentified bacterial numbers were subtracted (Table 1, and Figure 1). Extremely high numbers of total bacteria in compost D (316.2×10^9 MNP g⁻¹) are attributed to the higher number of Staphylococcus sp. (297×10^9 MNP/g), where Staphylococcus aureus occupied most of them (95.7%) (Table 1). Staphylococcus sp. was also the numerically dominant bacteria in compost BB (55.2×10^9 MNP g⁻¹), which occupied 67.9% of the total bacterial number (86.03×10^9 MNP g⁻¹) (Table 1, Figure 1). The higher number of total bacteria in compost C (146.4×10^9 MNP g⁻¹) is attributed to the number of spore-forming bacteria group, such as Bacillus sp. (21.0×10^9 MNP), Paenibacillus sp., and Clostridium sp. (43.6×10^9 MNP g⁻¹; 65.6%) (Table 1 and S1). The number of spore-forming bacteria was also higher in compost B (25.7×10^9 MNP g⁻¹), which occupied 65.8% of the total bacterial number (41.2×10^9 MNP g⁻¹) (Table 1, Figure 1). As our former results about bacterial compositional changes during each composting process indicated

that the ratio of *Bacillus* groups increased to 54.4% and the bacterial number decreased after the thermophilic phase (Watanabe et al., 2015b), which were similar to those of the other reports (Cahyani et al., 2003; Partanen et al., 2010; Rebollido et al., 2008; Sasaki et al., 2009; Schloss et al., 2005; Yamamoto et al., 2009), the higher ratio of gram-positive bacterial groups seemed be caused by a higher survival ratio of relatively thermotolerant gram-positive bacterial groups during the thermophilic phase (Roman et al., 2015).

In contrast, there was no numerically dominant bacterial group in composts originating from cattle feces (E, F1, F2, and F3), and the ratios of gram-positive bacterial groups became lower (22.5% to 57.4%) than those of the former (A, B, BB, C, and D) (Table 1, Figure 1). This difference might be caused from the lower maximum temperature attained during the thermophilic phase, which was not enough to eliminate fecal bacteria and increase thermotolerant bacterial groups (Roman et al., 2015). As compost F1, F2, and F3 was made from the same cattle feces with the same composting process, differences in bacterial composition were caused from the difference in thermophilic condition, which was resulted from difference in starting condition as described in Material and Method (Table 1, Figure 1). As typical fecal bacteria and pathogenic bacteria was detected in the tested composts, such as *Clostridium perfringens* (C.perfri50, C.perfring, CP000246, M59103), *Fusobacterium nucleatum* (Fus.nuclea, AE009951, AJ133496) or *F.sunuuae* (Fus.simiae) in compost B, *Clostridium botulinum* (L37585, L37587, C.botulin6), *Mycoplasma salivarium* (M.salivari), and *Prevotellaoris* (L16474) or *Bacteroides eggerthii* (L16485) in compost BB, *Bacteroides* sp. (AY008308), *Clostridium butyricum* (AY442812, C.butyric2, C.butyric3, C.butyric4), and *Fusobacterium* sp. (AF287805, AF385575, AF432130) in compost C, *Ehrlichiasp.* (Ehr.ris081, Ehr.risKEN, Her.ristic, M73225) or *E.sennetsu* (M73225), and *Leptonema illini* (Lpn.illini, Z21632) in compost D, *Bordetella* sp. (DQ132877) and *Fusobacterium nucleatum* (Fus.nuclea) in compost E, and *Fusobacterium nucleatum* (Fus.nuclea) and *Parachlamydia* sp. (AF366365, AJ715410) or *Spirillum winogradskii* (AY845251) in compost F3 (Table S1), these composts were indicated to include bacteria of fecal origin. As typical fecal bacteria such as *Fusobacterium* sp., *Borrelia anserine*, and *Leptospira fainei*, were also detected in the former studies (Watanabe et al. 2015b), the fecal bacteria and pathogenic bacteria were not always completely eliminated during the composting process, as reported in other results (Brinton et al., 2009; Reynnells et al., 2014).

As typical fecal bacteria such as *Mycoplasma sualvi* (M. sualvi), *Prevotellanumnicola* (AB003401), *P. oralis* (L16480), and *Spiroplasma* sp. (M24662, Spp.cit2HP, Spp.poulsn) had been detected in paddy

field soil annually applied with compost (Watanabe et al., 2015a), compost application was suggested to disperse fecal bacteria originating from livestock to field soil.

b) Phylogenetic estimation and enumeration of MRB

In the composts originating from chicken droppings and pig feces (compost A, B, BB, C, and D), compost C included a considerable number of MRB (1.0 x10⁴MPN g⁻¹), and compost D included a higher number of MRB (84.9 x10⁴MPN g⁻¹) (Table 2). The composts originating from cattle feces (compost E, F1, F2, and F3) included MRB from 43.2 x10⁴MPN to 84.9 x10⁴MPN g⁻¹ (Table 2). There was a large difference between the composition of general bacteria and that of MRB, where the gram-positive bacterial group was not numerically dominant (Figure 1, and 2). Uncultured *Sphigomonadaceae* (AF408325) was the numerically dominant MRB in compost E (67.1x x10⁴MPN) and various *Sphnigomonas* sp. were the numerically dominant MRB in compost F1 (Table 2, and Figure 2). As composts F1, F2, and F3 were made from the same cattle feces under the same composting process, the compositional difference of MRB among the composts was suggested to be caused from a slight difference in starting conditions (Table 2, Figure 2).

As typical fecal bacteria, such as *Bacteroides coprocola* (AB200223, AB200225, AB200225) and *Borrelia recurrent is* (AF107356, U42300), were detected as MRB in compost E, and *Bacteroides bacterium* (AY162121) was detected in compost F2 (Table 2S), these composts were indicated to include MRB of fecal origin.

The present data indicated that most composts used by organic farmers in various region of Japan not only included MRB but also pathogenic bacteria of livestock origin. The present results were enough to promote awareness that these hazardous bacteria might contaminate fresh vegetables from field soils, as suggested by the other reports (Watanabe 2008, 2009; Watanabe et al., 2015a; Yong et al., 2016). As elimination of contaminated hazardous bacteria from field soils was difficult (Watanabe 2008, 2009; Watanabe et al., 2015a), their existence in compost had to be checked before spreading into field soil. For this purpose, the method used in this manuscript was found to be suitable.

IV. CONCLUSIONS

Composting is a biological aerobic decomposition process of biomaterials consisting of two different phases: first, the thermophilic phase and next, the maturing phase (Misra et al., 2003; Roman et al., 2015). First, in the thermophilic phase, microbiological degradation of easily degradable biomaterial in feces elevated the temperatures and diminished the moisture content, while fecal bacteria in livestock feces were eliminated and only thermotolerant bacterial groups

survived (Cahyani et al., 2003; Partanen et al., 2010; Rebollido et al., 2008; Roman et al., 2015; Sasaki et al., 2009; Schloss et al., 2005; Yamamoto et al., 2009). However, the attained maximum temperature and reduction of moisture content were varied depend on starting conditions and air supply during this phase (Roman et al., 2015), which would affect numbers of residual fecal bacteria.

Significant positive correlation of the total bacterial number (2) with those of the gram-positive bacterial group (3) ($R=0.976$, $P<0.001$ $n=9$, Table 3) suggested that variation in number of thermotolerant gram-positive bacteria caused the major bacterial difference among the tested 9 composts, which might be mainly affected by a conditional difference in thermophilic phase and could be used as an index to speculate the condition of the thermophilic phase for each compost.

As the ratio of the gram-positive bacterial number to the total bacterial number (4) had significant negative correlation to those of gram-negative MRB (6) ($r=-0.723$, <0.01 , $n=9$, Table 3), those of the MRB of Sphingomonadacea (7) ($r=-0.687$, <0.05 , $n=9$), and those of the MRB of the other α -Proteobacteria (8) ($r=-0.901$, <0.001 , $n=9$), numbers of most of the MRB in the composts varied in reversal trend against that of the gram-positive bacterial group (Oliver et al., 2020; Sharma et al., 2009; Wang et al., 2015; Youngquist et al., 2016). As the ratio of gram-positive bacteria would become higher by an effective thermophilic phase, where a higher maximum temperature and lower moisture content was attained (Misra et al., 2003; Roman et al., 2015), MRB might be reduced by the same abiotic factors during thermophilic phase.

Moisture content (1), which had decreased by an effective thermophilic phase (Misra et al., 2003; Roman et al., 2015), had positive correlations with the ratios of MRBs ((5)-(8) from $r=0.384$ to $r=0.791$; Table 3). Significant positive correlation between moisture content (1) and the ratio of gram-negative MRB (7) ($R=0.791$, $P<0.05$, Table 3) suggested that moisture content might be a critical factor to eliminate gram-negative MRB during a thermophilic phase. The elimination of MRB by controlling the composting process will be presented in the next manuscript.

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Supplemental Material

Supplemental Table 1 shows the phylogenetic estimations of general bacteria in each dilution vial, whose DNA was extracted after the incubation of diluted samples in an LB medium.

Abbreviations: ARG antibiotic resistant gene; MERFLP multiple enzyme restriction fragment length polymorphism; MPN most provable number; MRB multidrug resistant bacteria; NGS next generation sequencing; qPCR quantitative polymerase chain reaction; RDP the Ribosomal Database Project.

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Factors Influencing the use and Abuse of Drugs by Commercial Drivers: A Case of Commercial Drivers in Ghana

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Methodology: We developed and introduced a self administered questionnaire using a sample of 300 questionnaires. These were administered and carefully edited to ensure some level of consistency, clarity and reliability in the information gathered. Purposive sampling approach was used in the selection of commercial bus stations and cargo stations of selected regions depending on the locations of these stations and the population of vehicles. Backward elimination regression model-building technique was used in the selection of significant variable(s) into a fitted logistic regression model. Five percent statistical level of significance was required for a variable to stay in the model.

Keywords: *drunk driving, substance abuse, marijuana, odds ratio, accidents.*

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Results: Commercial bus drivers who responded or participated in this study were male adults within the active age and forty one percent were illiterate. About, thirty four percent of these commercial drivers admitted to using drug when driving and seventy percent of these drivers learned how to drive from unapproved driving institutions. Educational levels of these drivers, hours used to drive, how the commercial drivers were trained and distance they traveled were the most significant variables associated with the use of drug by commercial drivers.

Conclusion: In conclusion, there exists significant association between Levels of educational, distance traveled, time used in driving and drug Use by these commercial drivers. Drunk driving is a major threat to the development of Ghana. This threaten our transportation industry and measures ought to be taking to address this problem.

Keywords: drunk driving, substance abuse, marijuana, odds ratio, accidents.

I. INTRODUCTION

A drug can be defined as any chemical which is taken in order to treat or prevent an illness or disease. But these substances are mostly abuse as a result of their pleasant effects or reactions in the human system. Drug driving is the action or offense of

driving a motor vehicle while under the influence of drugs, especially those that are illegal. Substance use and abuse by commercial drivers when driving should be of concern to both users and the general public.

According to a report by the Ghana National Road Safety Commission in 2012, substance use (Drug) among commercial drivers is one of the most serious challenges confronting the transportation industry in Ghana. The report indicated that, thirteen thousand, five hundred and twelve (13535) crashes have been recorded resulting over two thousand and sixty nine (2069) deaths.

a) Road accidents related to alcohol abuse

Significant number of road accidents can be attributed to drug use and drunk driving globally. The increase in the number of road traffic accidents in a report by the Ghana National Road Safety Commission, calls for a review of drunk driving in the country. The study was conducted to determine the types and use of drugs by drivers in Ghana. This will determine the social and cultural factors that influenced drug driving.

Significant number of road accidents can be attributed to drug use and drunk driving globally. Statistically, different patterns of usage are seen between population subgroups based on age, ethnicity, education, and marital status. This study is to compare whether or not those prevailing conditions are similar to commercial drivers in Ghana. In December, 2012, approximately 246 people died and about 1260 were injured in car accidents. According to the Commission, the major cause of road accidents in Ghana is due to over speeding. This accounts for 60 percent of car crashes in the country. This rising figures calls for review of the causes of these accidents.

[1] conducted a study to evaluate the use of alcohol and marijuana in Pakistan among commercial drivers. Ten percent of truck drivers used alcohol and thirty four percent used marijuana while driving on Pakistani roads.

In a research conducted by [2] on the prevalence of alcohol in injured Swedish drivers, the result indicated that 38 percent of the fatally injured drivers tested positive to alcohol.

Globally, significant proportion of road traffic accidents can be attributed to the use and abuse of

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alcohol and marijuana while driving. A study that was conducted by [3] to determine the use of alcohol and marijuana in Pakistan commercial drivers. A sample of bus and truck drivers were interviewed at the largest commercial vehicle terminals.

Statistically, different patterns of usage are seen between population subgroups based on age, ethnicity, education, and marital status [4]. This study is to compare whether or not those prevailing conditions are similar to commercial drivers in Ghana. According to the Ghana Road Safety Commission, the major cause of road accidents in Ghana is due to over speeding. This accounts for 60 percent of car crashes in the country. This rising figures calls for review of the causes of these accidents.

In a research conducted by [5, 6] on the prevalence of alcohol in injured Swedish drivers, the result indicated that 38 percent of the fatally injured drivers tested positive to alcohol. In a research conducted by [7] on several commercial drivers and their Blood Alcohol Concentration (BAC) to determine the association between BAC and road traffic accidents for these drivers. It was found that a relationship between BAC and the risk of becoming involved in a road traffic accident existed. Roadside studies conducted in the United States found that [8] 17 percent of the drivers had a Blood Alcohol Concentration (BAC) above the legal limit. By comparing this figure to the European roadside studies [9], the percentage is a bit higher. Taking into account that the legal limit for driving in the United States of America can be higher than in Europe (0.08 percent versus 0.05 percent).

b) *Road accidents related to Cannabis and Tobacco abuses*

Smoking a cigarette can be regarded as a secondary task that may potentially distract from the primary driving task, or at least causes the driver to divide his attention between both activities when lighting up and extinguishing the cigarette [10]. Nicotine is known for its cognitive enhancing effects by reducing reaction time and increasing alertness. It can be hypothesized that smoking may actually improve driving performance. A few driving studies have focused on the effects of nicotine abstinence on driving performance [10]. A research conducted by [11] reported no difference in simulated driving performance between those who smoked a cigarette during the test and control subjects. Penning et al., (2010) however, indicated that when smokers had to refrain from smoking, they performed significantly worse. Surprisingly, a study conducted by [10] confirmed that driving performance of craving smokers significantly improved to normal (nonsmoker) levels after allowing them a cigarette.

Cannabis is to be the next most common drug of abuse found in drivers after alcohol [10]. A study

from New Zealand reported that almost 21 percent of young drivers admitted that they had driven at least once after smoking cannabis [12]. Approximately 60 percent of the interviewed Australian nightclub attendees reported that they were driven home by someone under the influence of tetrahydrocannabinol (THC) or that they drove themselves after smoking cannabis [13]. Roadside studies by [10] indicated that 15 percent of drivers drive under the influence of one or more drugs of abuse. After drug use, drivers are more often culpable for an accident than non-users. Other drugs also implicated include benzodiazepines, cocaine, opiates, and amphetamines [14]. This study is to use a mathematical model to determine whether those conditions are the same in developing countries, especially Ghana.

A study of fatally injured drivers in Australia showed that when marijuana was present in the blood of the driver, he or she was much more likely to be at fault for the accident [15]. The matter of concern is not the rising figures nor the statistics of drug or alcohol use by commercial vehicle drivers but factors associated with the use of these chemical substances. This study is therefore to determine the social factors associated with substance by drivers as well as the commonest substances that are abused by these drivers in Ghana [16].

c) *Road accidents related to drugs and substance abuse*

Generally, inhalants are commonly abused drugs by some commercial drivers in Ghana. The findings of [2] indicated that 0.1 percent of Spanish drivers admitted to have driven at least once after non medical use of inhalants. Moreover, researchers in Australia indicated that 5 percent interviewed drug users admitted ever driven under the influence of an inhalant Darke [17]. Investigations among US students indicated that 5.2 percent had abused inhalants before the ages of 18 years and approximately 62 percent of them had driven a car while under the influence of alcohol or drugs [18].

[18] examined the effects of inhalants on psycho-motor functioning. The result indicated that inhalants significantly impaired auditory reaction time, coordination and estimation. Moreover, memory function was also affected. Researchers also concluded that the subjects were much more tired after using isoflurane and sevoflurane.

[19] reported that inhalants are abused, they can cause hallucinations and distortions in perception as well. In addition, impaired muscle coordination and body balance may lead to road traffic accidents. [20] supported these findings and added, slurred speech, euphoria and decreased reflexes as commonly reported side effects.

[21] reported that 7 percent of fatally injured truck drivers had used metham-phetamines, when compared to 13 percent who had used cannabis or alcohol. However, some studies reported very high percentages of commercial drivers who use amphetamines. Methamphetamine use among commercial drivers is of great concern in respect of road traffic safety.

[22] investigated the effects of methamphetamine in narcoleptic patients and healthy subjects. Methamphetamine improved performance of narcoleptic patients in the driving simulator in a dose dependent manner.

[23] tested the effects of dexamphetamine, a drug with similar effects as metham-phetamine. This drug significantly impaired simulated driving performance during daytime testing. But night-time testing showed no significant differences from placebo were found. [24] reviewed literature on amphetamine and metham-phetamine and the findings are that low dosages of amphetamine significantly improve psychomotor performance of fatigued subjects. [25] came out with the conclusion that most studies that examined the behavioral effects of stimulant drugs report an increase in risk taking behaviour and impaired decision making.

[25] concluded that both low and high dosages of methamphetamine may have an effect on driving performance.

Only few studies looked at the effects on driving of other drugs of abuse, such as ketamine, inhalants and anabolic steroids, but suggest a negative effect on driving performance [10]

A number of studies have examined illicit drug use in drivers involved in motor vehicle crashes, reckless driving, or fatal accidents. One study found that about 34 percent of motor vehicle crash victims admitted to a Maryland trauma center tested positive for drugs only, about 16 percent tested positive for alcohol only. Approximately 10 percent tested positive for alcohol and drugs, and within this group, 50 percent were younger than age 25 years [26].

Studies conducted in several localities have found that approximately 4 to 14 percent of drivers who sustained injury or died in traffic accidents tested positive for delta-9-tetrahydrocannabinol, the active ingredient in marijuana [27].

In a study of fatally injured drivers from three Australian states (Victoria, New South Wales, and Western Australia), drugs other than alcohol were present in most of the cases. [15]. These included cannabis, stimulants, benzodiazepines, and other psychotropic drugs. Almost 10 percent of the cases involved both alcohol and other drugs. This study is to determine the significant factors associated with the use of these drug.

A Roadside studies by [10] indicated that one to fifteen percent of drivers drive under the influence of one or more drugs of abuse. Findings of this study showed that drivers most frequently test positive for the use of alcohol or cannabis. These two drugs affect driving ability and result in poor vehicle control.

Most drugs negatively affect driving ability, especially when used in combination with alcohol or another drug. It is of concern that a substantial number of drug users are not aware that their driving is impaired [10].

Progress has been made in Ghana in reducing the use of alcohol and drugs by commercial vehicle operators over the past few years. Drug use prevention and testing programs have been instituted by the Motto Traffic and Transport Unit (MTTU) of the Ghana Police Service.

II. METHODOLOGY

We employed the Logistic regression model analysis to determine the significant factors of substance abuse by drivers.

All factors that believed to be determinants of the use and abuse of substance by these drivers were considered. These are determinants contributed to the likelihood of substance abuse by drivers.

Logistic regression model was employed to pick the significant factors that are believed to contribute to substance abuse in drivers. Firstly, a questionnaire was used to identify potential variables that are believed to have a significant influence on substance abuse by commercial vehicle drivers.

After which a logistic regression model was used to select those factors which were indicated to be significant. Finally, the final outcome was used to determine if the model is well fit and if the variables selected are important predictors for our models.

Significance of each of the explanatory (independent) variables is assessed by carrying out statistical tests of the significance of the coefficients. The overall goodness of fit of the model is then tested.

Finally, the model is validated by checking the goodness of fit and discrimination on a different set of data from that which was used to develop the model.

III. DESCRIPTIVE AND DATA DISTRIBUTIONS

a) Age Distribution

Commercial drivers between the ages of 31-50 years forms majority of the population. But there are few drivers between the ages of 21-30 years. Figure 1 shows the population distributions of commercial drivers.

Table 1: Age Distribution

Age(years)	Number
21-30	41
31-40	92
41-50	87
51-60	55
61+	24

AGE DISTRIBUTION OF DRIVERS

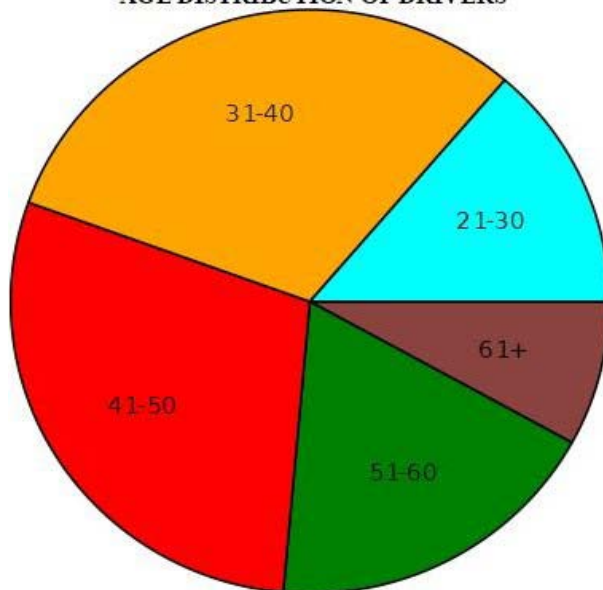


Figure 1: Age distribution of commercial drivers.

b) Religious Status

Many espondents are Christians and Muslims. However, both religions are against drugs and substance abuse. About 90 percent of these drivers

come from both Islam and Christian religion. Table 2 shows the religious distributions of substance abuse by drivers from Islam and Christian religions.

Table 2: Religious Status

Religious Status	Number
Christianity	135
Islam	134
Traditional	31
Others	0

c) Educational Status

Approximately, 59 percent of the respondents meet the requirement of the Driver and Vehicle Licensing Authority (DVLA) of Basic Education Certificate Examination (BECE). Illiteracy level of the drivers who responded is higher. About 41 percent of the

commercial drivers interviewed have never being to school. This is of greater concern since the interpretation of road signs requires a certain level of basic education. This account for the significance or the likelihood of substance use by drivers. Most commercial drivers do not even know the dangers of drug driving.

Table 3: Level of Education

Level of Education	Number
Never being to school	123
Primary/J.H.S	158
Secondary	19
Tertiary	0

EDUCATIONAL STATUS OF DRIVERS

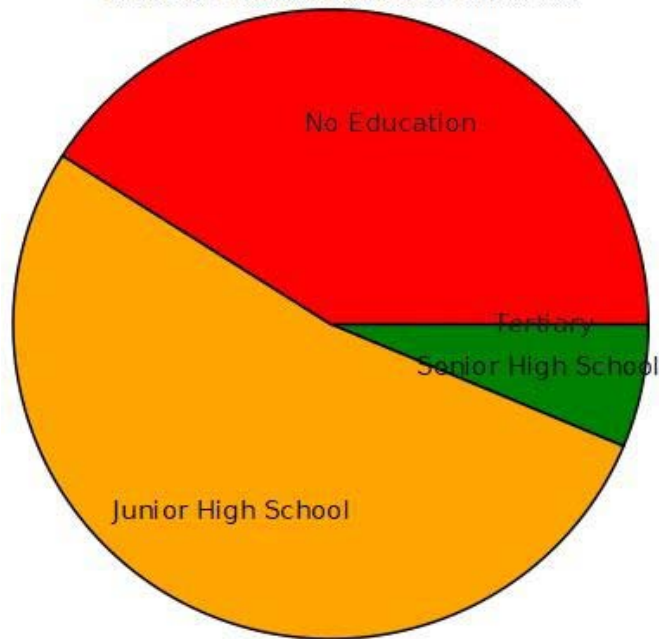


Figure 2: Educational background of commercial drivers.

d) *Marital Status*

A number of respondents are married and constituted about 66 percent of the total respondents. They are people who provide for the up keep of their families. Clearly, this explains why marital status is not a

determinant of substance abuse by commercial drivers. There are no association between marital status and the use of drug by commercial drivers. Table 4 shows the marital status of commercial drivers used in the survey.

Table 4: Marital Status

Marital Status	Number
Single	49
Married	197
Devoice	50
Cohabiting	4

MARRITAL STATUS OF DRIVERS

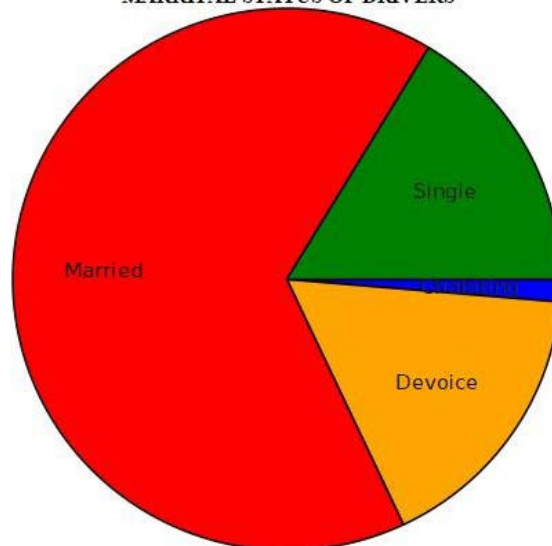


Figure 3: Marital status of commercial drivers.



e) *Drug Use*

Approximately, thirty four percent of the respondents confirmed the use of some substances to enhance their performance or keep them awake for long hours of driving.

Most drivers are of the view that the use of substances enables them to drive faster with

concentration and to be able to go for more trips. All these comes with financial benefits according to most of them. Table 5 gives the distributions of response from drivers regarding the use of drugs.

Table 5: Drug Driving

Drug Use	Number of Driver(s)	Percentage
YES (1)	102	34.0
NO (0)	198	66.0

f) *Type of Vehicle*

Type of vehicle a driver uses determines time and distance expected to cover. Respondents who travel long hour are mostly used trailers and coaches. This is

why those who use trailers and coaches use chemical substances as they usually travel long distances. Table 6 shows the various vehicles commonly used by drivers in the study.

Table 6: Type of Vehicle

Type of vehicle	Number
Trailer truck	67
Coaches/Bus	58
Cargo truck	75
Dumper truck	36
Mini Bus	28

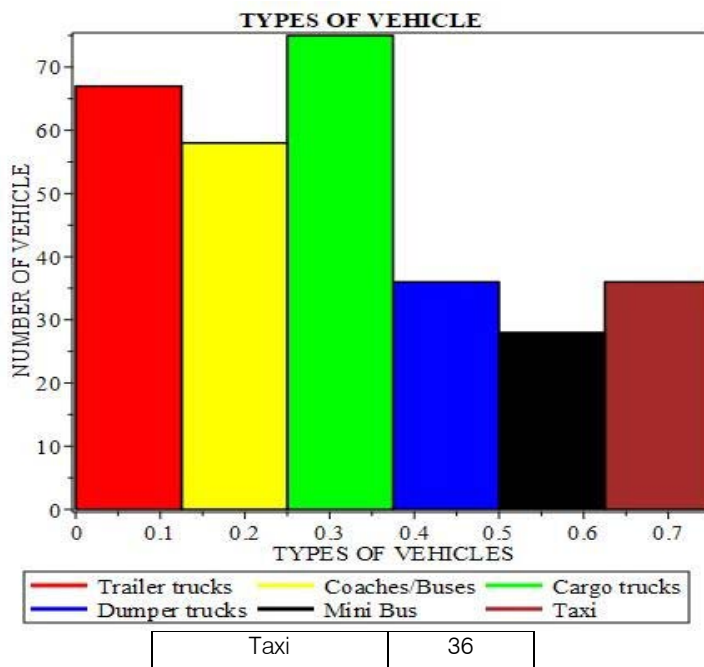


Figure 4: Types of vehicles used by commercial drivers.

g) *Mode of Training*

The manner in which drivers learn how to drive is a major concern for safety. Table 7 indicates that nearly 70 percent do not learn from the recognised or approved institutions. Drivers mostly learn from friends, family members or learning on job. Safety and safe driving is the priority of every driving institution.

Table 7: Mode of Driver Training

Training	Number
Driving School	87
Family/Friends	59
Learning on Job	55
Self Tutoring	49
Other	50

h) *Time(Hrs) used to drive*

Table 8 below indicates that more than 60 percent of the respondents drive for long hours ranging from 9 hours and above in a single trip. There is a relationship between substance use and hours of

continuous driving. Stress and fatigue on the part of the respondents influences the use of some chemical substances. As the illiteracy rate of the respondents is high, they are unaware of the dangers associated with use of these drugs.

Table 8: Time used to drive

Time(Hrs)	Number
6	28
7	24
8	64
9	59
10+	125

i) *Commonest Drugs Used by Drivers*

Table 9 shows the commonest drugs usually administered by commercial drivers. In all, 102

respondents admitted to using some drugs as stimulants when driving. This represent 34 percent of the total respondents.

Table 9: Types of Drug Use by Drivers

Name of Drug	Common or Local Name(s)
Cannabis	Marijuana, Wee, Ganja
Opiates(Opium)	Codeine, Morphine, Pethidine
Volatile Inhalants	Spray, Glue, Gases
Tranquilizers(Sedatives)	Volume (5,10), Blue-Blue
Cocaine or Heroine	White powder, Brown sugar, Crack
Alcohol	Akpeteshi, Beer
Amphetamines(Stimulants)	Nescafe, Ataya
Cola Nuts	Goro, Bissi
Cigarette	King Size, 555, Embassy

j) *Reasons for Drug Use*

Table 10 shows the reasons given by the respondents for the use and abuse of drugs. The commonest among the reasons were as follows;

Sleeping without drug, fatigue, drive long hours and pressure from car owners. Few of the respondents are of the view that there are no regular checks for drug driving as well as strict drug policy for drivers.

Table 10: Reasons for Drug Use

Reason	Number
Obtain peace and calm	14
Keeps you awake	34
Addiction	6
Relieves fatigue	26
Difficult driving without drug	33
Pleasure while driving	22

Do not know	5
Feels relaxed and drives easier	27
Makes one drive faster	25
Stay awake for hours	47
Pressure from car owners	27
No policy or punishment	9
No regular check points	12
Weight control behaviour	13

IV. DATA ANALYSIS

a) Analysis of Maximum Likelihood Estimates

Table 11 shows the output of the coefficients, standard errors, z-statistic (Wald z-statistic), and the associated p-values.

The logistic regression coefficients give the change in the log odds of the outcome for a one unit increase in the predictor variable. For every one unit change in distance traveled (800km), the log odds of drug use (versus not drug use) increases by 5.6288 and for every unit change in 700km, the log odds of drug use versus not use increases by 6.2005.

For a one unit increase in time (9hrs), the log odds of being a drug user increases by 3.3789 and every unit change (7hrs), the log odds of being a drug user increases by 0.9470. Commercial drivers who learn on job, self taught and learn from friends are statistically significant but driving school is not significant. Mar-ital status is not statistically significant and therefore is not a determinant of drug use. Commercial drivers who travel long distances above 700 kilometers have significant p-values. This means that distance is a significant determinant of drug use by drivers.

Table 11: Coefficients

Coefficients	Estimate	Std. Error	z value	Pr(> z)
(Intercept)	-9.5176	2.8415	-3.350	0.000810 ***
age[21-30]	0.0000			
age[31-40]	-2.5937	1.1842	-2.190	0.028502 *
age[41-50]	-2.4622	1.2467	-1.975	0.048277 *
age[51-60]	-2.0518	1.3342	-1.538	0.124095
age[61+]	-0.8094	1.2458	-0.650	0.515888
distance[100]	0.0000			
distance[200]	2.0036	1.8626	1.076	0.282053
distance[300]	-0.4490	2.3589	-0.190	0.849028
distance[400]	0.4749	2.2327	0.213	0.831568
distance[500]	0.9555	2.1976	0.435	0.663724
distance[600]	2.8958	2.3134	1.252	0.210670
distance[700]	6.2005	2.2884	2.710	0.006738 **
distance[800]	5.6288	2.2048	2.553	0.010682 *
distance[900+]	7.6054	2.3340	3.259	0.001120 **
education[Never]	0.0000			
education[primary/JHS]	-1.4316	0.5744	-2.492	0.012692 *
education[secondary]	-4.6529	1.4413	-3.228	0.001246 **
mstatus[single]	0.0000			
mstatus[married]	1.4788	1.0258	1.442	0.149406
mstatus[devoice]	1.6542	1.1288	1.465	0.142801
mstatus[cohabiting]	-15.0934	1559.8634	-0.010	0.992280
religion[christianity]	0.0000			
religion[islam]	0.4423	0.6033	0.733	0.463455
religion[traditional]	2.4259	0.9491	2.556	0.010591 *

time[6]	0.0000			
time[7]	0.9470	1.6971	0.558	0.576826
time[8]	2.1849	1.1605	1.883	0.050100
time[9]	3.3789	1.2721	2.656	0.007903 **
time[10+]	4.0090	1.1156	3.594	0.000326 ***
training[driving school]	0.0000			
training[friends]	4.7524	0.8723	5.448	5.09e-08 ***
training[learning on job]	5.4805	1.0253	5.346	9.01e-08 ***
training[self tutoring]	1.6451	0.8461	1.944	0.051861 .
training[other]	0.7260	0.8414	0.863	0.388197
vehicle[trailer]	0.0000			
vehicle[mini bus]	1.0255	1.1606	0.884	0.376900
vehicle[dumper truck]	1.6553	1.5397	1.075	0.282337
vehicle[cargo truck]	-1.3082	0.7798	-1.678	0.093430 .
vehicle[coaches]	0.6760	1.9613	0.345	0.730355
vehicle[taxi]	1.2415	1.5229	0.815	0.414950

b) Odds Ratios(OR)

In Table 12, there is 95 percent confident that for a one unit increase in time, the odds of drug use by a commercial driver who drives for more than 10 hours versus not using drug increases by a factor of 5.509293e+01. The odds of drug use for a commercial driver using a dumper truck is between 2.894950e-01 and 1.353064e+02.

We are 95 percent confident that for a one unit increase in distance, the odds of drug use by a commercial driver who drives for than 900 kilometers versus not using drug increases by a factor of 2.008983e+03.

Table 12: ODDS RATIOS

Variable	ODDS RATIO	2.5 percent	97.5 percent
(Intercept)	7.354505e-05	1.428725e-07	1.121890e-02
age[31-40]	7.474196e-02	6.577162e-03	7.091162e-01
age[41-50]	8.524946e-02	6.531945e-03	9.100546e-01
age[51-60]	1.285092e-01	8.534147e-03	1.683472e+00
age[61+]	4.451276e-01	3.460478e-02	4.824807e+00
distance[200]	7.415634e+00	2.332663e-01	4.701014e+02
distance[300]	6.382445e-01	4.814157e-03	7.583486e+01
distance[400]	1.607809e+00	2.433147e-02	2.136692e+02
distance[500]	2.599846e+00	3.893110e-02	2.136692e+02
distance[600]	1.809758e+01	2.624222e-01	2.632232e+03
distance[700]	4.930109e+02	9.634324e+00	8.423085e+04
distance[800]	2.783408e+02	6.355358e+00	4.002675e+04
distance[900+]	2.008983e+03	3.548114e+01	3.683694e+05
education[primary]	2.389364e-01	7.227582e-02	7.044533e-01
education[secondary]	9.533762e-03	3.869645e-04	1.147145e-01
mstatus[married]	4.387837e+00	6.140997e-01	3.521826e+01
mstatus[devoice]	5.228772e+00	5.852233e-01	5.030545e+01
mstatus[cohabiting]	2.786201e-07	5.652233e-01	9.621607e+29
religion[islam]	1.556342e+00	4.807932e-01	5.267230e+00
religion[traditional]	1.131217e+01	1.897967e+00	8.108981e+01
time[7]	2.578066e+00	8.673554e-02	7.682196e+01

time[8]	8.889540e+00	1.039258e+00	1.058949e+02
time[9]	2.933885e+01	2.825415e+00	4.539337e+02
time[10+]	5.509293e+01	7.644572e+00	6.543038e+02
training[friends]	1.158582e+02	2.418215e+01	7.684636e+02
training[on job]	2.399782e+02	3.893176e+01	2.264460e+03
training[self taught]	5.181556e+00	1.023111e+00	2.937798e+01
training[other]	2.066831e+00	3.862077e-01	1.101892e+01
vehicle[mini bus]	2.788545e+00	3.074893e-01	3.069662e+01
vehicle[dumper truck]	5.234497e+00	2.894950e-01	1.353064e+02
vehicle[cargo truck]	2.703109e-01	5.435443e-02	1.201289e+00
vehicle[coaches]	1.965929e+00	3.906809e-02	9.421414e+01
vehicle[taxi]	3.460717e+00	2.210596e-01	9.827966e+01

V. ANALYSIS OF DEVIANCE

a) Analysis of Deviance (Model 1: AIC=187.91)

Table 13 shows the backward elimination regression model-building technique was used to select the significant variable(s) into a fitted logistic regression model. This technique begins with a full model (i.e. model with all the variables under study) and deletes variable one by one until the model begins to degrade. Each deletion of variables from the model is explained in a sequence of Models. A 5 percent statistical significance level is required for a variable to stay in a

model. Table bellow shows the results obtained from the full model (Model 1). From this model, Level of education with (p-value=3.114e-05 ***), time used to drivewith (p-value=0.0005852 ***), mode of training with (p-value=2.2e-16 ***), and distance traveled with (p-value=2.2e-16 ***), were the most significant variables associated with the use of drug by commercial drivers. The remaining variables such as age, religion and type of vehicle used were not significant. Therefore, this resulted to an Akaike's information criterion (AIC) statistic of 187.91

Table 13: Analysis of Deviance (Model 1: AIC=187.91)

Variable	Df	Deviance	Resid. Df	Resid. Dev	P(> Chi)
NULL				299	384.62
age	4	0.457	295	384.16	0.9775398
distance	8	114.079	287	270.09	2.2e-16 ***
education	2	20.754	285	249.33	3.114e-05 ***
mstatus	3	8.326	282	241.01	0.0397362 *
religion	2	3.673	280	237.33	0.1593930
time	4	19.651	276	217.68	0.0005852 ***
training	4	88.100	272	129.58	2.2e-16 ***
vehicle	5	7.668	267	121.91	0.1754806

b) Analysis of Deviance (Model 2: AIC=186.54)

In Model 2, variable Age was dropped because it was the least significant with the highest p-value as indicated in Table 14. This resulted in improving the Akaike's information criterion (AIC) by reducing it slightly from 187.91 to 186.54. Similarly to the results in Model

1, Level of education with (p-value=4.525e-05 ***), time used to drive with (p-value=0.0003287 ***), mode of training with (p-value=2.2e-16 ***), and distance traveled with (p-value=2.2e-16 ***), were the only variables that were significantly associated with the current use of drug in Model 2.

Table 14: Analysis of Deviance (Model 2)

Variable	Df	Deviance	Resid. Df	Resid. Dev	P(> Chi)
NULL				299	384.62
distance	8	113.542	291	271.08	2.2e-16 ***
education	2	20.006	289	251.07	4.525e-05 ***
mstatus	3	8.084	286	242.99	0.0443135 *
religion	2	3.035	284	239.95	0.2193018

time	4	20.918	280	219.04	0.0003287 ***
training	4	82.593	276	136.44	2.2e-16 ***
vehicle	5	7.902	271	128.54	0.1616969

c) *Analysis of Deviance (Model 3: AIC=187.1)*

In model third (3rd) model, the AIC statistic became worst. It increased from 186.54 to 187.1) when the variable 'Religion' was dropped as indicated in Table15.

Table 15: Analysis of Deviance (Model 3: AIC=187.1)

Variable	Df	Deviance	Resid. Df	Resid. Dev	$P(> Chi)$
NULL				299	384.62
distance	8	113.542	291	271.08	2.2e-16 ***
education	2	20.006	289	251.07	4.525e-05 ***
mstatus	3	8.084	286	242.99	0.0443135 *
time	4	21.594	282	221.40	0.0002414 ***
training	4	80.134	278	141.26	2.2e-16 ***
vehicle	5	8.158	273	133.10	0.1477385

d) *Analysis of Deviance (Model 4: AIC=185.26)*

Finally, in the fourth model, the AIC statistic became better when it was reduced from 187.1 to 185.26.

The variables: Level of education with (p-value=4.525e-05***), time used to drive with (p-value=0.0003287***) mode of training with (p-value=2.2e-16***) and distance traveled with

(p-value=2.2e-16***) were the only variables that were significantly associated with the current use of drug in Model 4.

However, comparing the models 1, 2, 3 and 4 based on their AIC statistic, the fourth model was selected for yielding the least AIC at 185.26 as shown in Table16.

Table 16: Analysis of Deviance (Model 4: AIC=185.26)

Variable	Df	Deviance	Resid. Df	Resid. Dev	$P(> Chi)$
NULL				299	384.62
distance	8	113.542	291	271.08	2.2e-16 ***
education	2	20.006	289	251.07	4.525e-05 ***
mstatus	3	8.084	286	242.99	0.0443135 *
time	4	21.594	282	221.40	0.0002414 ***
training	4	80.134	278	141.26	2.2e-16 ***

e) *Test of Overall fitness of the fitted model*

The measure of how well our model fit is the significance of our overall model. We test for whether our model with predictors fits significantly better than our

model with just an intercept (null model). The test statistic is the difference between the residual deviance for the model with predictors and the null model.

Table 17: Overall fitness of the model

Test	Value	DF	P-value
Chi-Square	121.91	267	7.093043e-16

The chi-square of 121.91 with 267 degrees of freedom and an associated p- value of 7.093043e-16 which is less than 0.005 tells us that our model as a whole fits significantly better than an empty model as shown in Table 17.

significantly associated with substance use and abuse by drivers. The following predictor variables are likely to influence the abuse of drug by commercial drivers: The distance covered, time (hours) used to travel, mode of training and the commercial driver educational level.

VI. CONCLUSION

Social determinants of substance abuse by drivers in Ghana were identified. Some factors were

Educational levels of drivers was associated with substance use. Most widely used substances (drugs) among drivers in Ghana are alcohol, cannabis (marijuana), volatile inhalants (spray, glues),

amphetamines (stimulants such as nescafe, ataya) and cigarette. A number of drivers admitted to using some substances before driving. There are significant relationship between substance use and hours of continuous driving.

Most of the drivers learn how to drive from an unapproved driving schools. Approximately, 71 percent do not learn from the approved driving institutions. Learning from recognise driving schools should be encouraged by government. Safety and safe driving is the priority of every driving institution.

The model analysis shows that Level of education, time used to drive, mode of training and distance traveled were the most significant variables associated with the use and abuse of drugs by drivers. The remaining variables such as age, religion and type of vehicle used were not significant.

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There are no sources of funding obtained for this study.

Data Availability Statement

The data used in this study was obtained from a questionnaire administered to selected number of commercial drivers in Ghana.

Conflict of interest

Author declare that there are no conflict of interest regarding the publication of this study.

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The Psychological Effects of the Covid 19 Pandemic on Adolescents

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Abstract- As of march 2022, the World health Organisation stated that the COVID-19 pandemic has triggered an immense 25% increase in the global prevalence of anxiety and depression (WHO, 2022). It is important that precautions are taken to protect the mental health of individuals affected by the pandemic and more specifically the youth. This paper aims to investigate the psychological effects of the pandemic on adolescents and it also sheds light on the coping mechanisms used by these individuals. By integrating results from various research a general conclusion was made that the COVID-19 pandemic has altered the daily activities of adolescents, causing stress, depression, harmful lifestyle engagements and even self-injury.

Keywords: Covid-19, adolescent, mental health, psychological effects, pandemic.

GJMR-K Classification: DDC Code: 614.5 LCC Code: RA644.S17



THE PSYCHOLOGICAL EFFECTS OF THE COVID 19 PANDEMIC ON ADOLESCENTS

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The Psychological Effects of the Covid 19 Pandemic on Adolescents

Kristel Ferrol ^α, Corrie Phillip ^σ, Rhinnata Williams ^ρ & Olugbenga Morebise ^ω

Abstract- As of march 2022, the World health Organisation stated that the COVID-19 pandemic has triggered an immense 25% increase in the global prevalence of anxiety and depression (WHO, 2022). It is important that precautions are taken to protect the mental health of individuals affected by the pandemic and more specifically the youth. This paper aims to investigate the psychological effects of the pandemic on adolescents and it also sheds light on the coping mechanisms used by these individuals. By integrating results from various research a general conclusion was made that the COVID-19 pandemic has altered the daily activities of adolescents, causing stress, depression, harmful lifestyle engagements and even self-injury.

Keywords: Covid-19, adolescent, mental health, psychological effects, pandemic.

I. INTRODUCTION

The Covid-19 pandemic, which began in late 2019, has disrupted social, educational and economical structures among other areas of life as we know it. More specifically the pandemic is having adverse psychological effects on individuals of varying ages. Some of these effects include depression, anxiety, suicide ideation and greater levels of perceived stress. The purpose of our research is to explore these psychological/ mental health impacts on adolescents. This group was chosen as these individuals are prone to be affected by psychological trauma that may leave long lasting effects. These are critical developmental years for these individuals who are now experiencing many aspects of life virtually instead of face to face. The extents of mental health effects brought on by the Covid-19 pandemic vary among adolescents; therefore these effects are highlighted and analysed in this research study.

Aim

To review the psychological effects of the Covid 19 pandemic on Adolescents.

Objectives

The objectives of this research are to:

- Identify the specific mental health effects of the pandemic on adolescents.

- Identify the coping mechanisms utilised by the affected adolescents.
- Identify the behavioural changes caused by the pandemic among adolescents.
- Investigate the severity of effects of the pandemic on adolescents with pre-diagnosed mental health disorders.

II. LITERATURE REVIEW

According to O'Sullivan et al. (2021), current research primarily and disproportionately focuses on Covid-19 and associated mental health effects on children and adolescents. They explain that although these children may not be direct victims of the virus itself, they are a vulnerable group and the effects of this pandemic may last a lifetime (UNSDG, 2020 as cited in O'Sullivan et al., 2021). The United Nations Sustainable Development Group reported that 94% of the school-going population were affected by the Covid-19 pandemic, with 86% of children in primary education being completely out of school in lower developing countries. These children have not only been out of school, but they are also experiencing reduced face to face and social interactions through imposed lockdowns and stay-at-home quarantine. With all of these restrictions, little room is left for them to experience meaningful interactions except through virtual and online platforms.

In the few studies that have been conducted, generally, it was found that the pandemic has negatively impacted the mental health of adolescents. Of these effects, increased levels of fear, anxiety and depression were observed in addition to increased suicide ideation (O'Sullivan et al., 2021; Cohen et al., 2021). These were all attributed to isolation /prolonged quarantine, decreased communication with peers and poor sleep (O'Sullivan et al., 2021; Cohen et al., 2021). Limitations of such studies revealed that: most interviewees were primarily college students, associations between and among variables could not be inferred (current studies are cross-sectional) and of the limited studies available, a few were not peer-reviewed (Elharake et al., 2022). It was also noted that many studies were dependent on the parents' perception and interpretation of their children's mental well-being and psychological state (Cohen et al., 2021). Moreover, the duration of currently available studies may not have provided ample time to assess changes in behaviours and mental state as they

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“varied from 3 weeks to 6 months concerning the implementation of public health measures” (Cohen et al., 2021). Together, these incidents allow significant room for misrepresentation and limit the accuracy of the findings. More research needs to be done to adequately represent these adolescents so that protective measures can be put in place to get them through these unprecedented times.

III. MATERIALS AND DESIGN

a) Study Design

The research subjects of this review were adolescents, including students who were ages 10-21 during the COVID-19 pandemic. The review articles for this research were published between 2019-and 2021

and conveyed a combination of review and qualitative research. This was ideal for the present research as it allows a detailed review of the psychological effects of the COVID-19 pandemic on adolescents.

b) Eligible Studies and Study Databases

For this research, the articles chosen were articles published during the COVID-19 pandemic which were obtained utilising google scholar. The main keywords used in the search were: COVID-19, adolescents, highschoolers, mental health and psychological effects. The information in the selected articles was reviewed by each author and utilised in the research.

IV. RESULTS

Author Reference	Title of paper	Main Finding
Krass et al (2021)	US Paediatric Emergency Department visits for mental health conditions during the COVID-19 pandemic.	A 1.7% increase departmental visits for mental health with an additional increase in suicide and suicide ideation by patients
Listernick&Badawy (2021)	Mental health implications of the COVID-19: PHMT. Paediatric Health, Medicine and Therapeutics.	Anxiety and depression were found to be the main mental health effects affecting adolescents.
Liang et al (2020)	The effect of covid-19 on Youth Mental Health - Psychiatric Quarterly.	The overall mental health of adolescents worsened during the course of the pandemic.
Saurabh &Ranjan (2020)	Compliance and psychological impact of quarantine in children and adolescents due to covid-19 pandemic. Indian journal of paediatrics.	Quarantined adolescents showed to have experienced some form of psychological distress compared to those who were not quarantined.
Essadek&Rabeyron (2020)	<i>Mental health of French students during the COVID-19 pandemic.</i> Journal of Affective Disorders.	It was reported that girls scored higher on anxiety, distress and depression scales
O'Sullivan et al (2021)	A qualitative study of child and adolescent mental health during the COVID-19 pandemic in Ireland. <i>International Journal of Environmental Research and Public Health</i> , 18(3), 1062.	The major cause of these psychological changes in these adolescents was mainly attributed to social isolation and other pandemic-related restrictions.
Lee (2020)	Mental health effects of school closures during COVID-19. <i>The Lancet Child & Adolescent Health</i> , 4(6), 421.	It was noted that 83% of respondents felt that the pandemic made their existing mental health conditions worse. 26% of these attributed the changes to limited mental health support due to reduced face-to-face services and communication challenges through the phone or online

Overall, it was found that the mental health of adolescents during the pandemic worsened. A study conducted only two weeks after the pandemic began noted that approximately 40.4% of the participants experienced psychological problems (Liang et al., 2020). In the US, emergency department visits for mental health increased by 1.7% with an additional increase in suicide and suicide ideation by patients (Krass et al. as cited in Listernick & Badawy, 2021). Likewise, Ravens- Sieberer (2021) revealed that "the prevalence of noticeable mental health problems was 9.9% before the pandemic and increased to 17.8% during the pandemic." This is a significant increase and a cause for concern.

Of all the symptoms of psychological stress, the main reported mental health effects found affecting adolescents during this time were anxiety and depression. Listernick & Badawy (2021) reported that the rates of paediatric anxiety before the pandemic increased by approximately 9.6% in China while in Germany, it increased similarly by 9%. Studies in the United Kingdom also share similar findings and report that children have experienced a 75% increase in depressive symptoms during lockdown (Listernick & Badawy, 2021).

Moreover, studies from India confirm the negative psychological impacts of the Covid-19 pandemic and quarantine. The research compared the mental health states of quarantined and non-quarantined children. The results from this study showed that approximately 68% of quarantined children and adolescents experienced some form of psychological distress; a significant difference from the results from the non- quarantined individuals (Saurabh & Ranjan, 2020). Of these individuals, 66.1% experienced helplessness, 68.59% experienced worry and 61.98% experienced fear (Saurabh & Ranjan, 2020 as cited in de Figueiredo et al., 2021). An interesting observation made was that individuals (adolescents) infected with Covid -19 or individuals in contact with infected persons scored higher on depression, distress and anxiety scales (Essadek & Rabeyron, 2020). Additionally, it was found that girls scored higher on anxiety, distress and depression scales (Essadek & Rabeyron, 2020).

Furthermore, the cause of these psychological changes in these adolescents was mainly attributed to social isolation and other pandemic-related restrictions (O'Sullivan et al., 2021; Margson et al., 2021). In the United Kingdom, a survey conducted by a mental health charity noted that 83% of respondents felt that the pandemic made their existing mental health conditions worse. Of this, 26% attributed these changes to limited mental health support due to reduced face-to-face services and communication challenges through the phone or online (Lee, 2020). Many students/ adolescents utilise the mental health services provided to them by their schools. With unpredictable lockdowns,

quarantines and closure of schools, it has become increasingly difficult for them to get help and make use of these services. Other causes of worsening mental health include financial losses/ financial insecurity, increased social media use, domestic violence, family stress and even the mental health of their parents (Margson et al., 2021).

As a result of the pandemic, physical distancing has posed a challenge for adolescents in their regular day-to-day interactions. It disallows the natural urge for physical touch, especially in situations where it is needed for comfort. This may harm adolescents as they may "bottle up" their emotions and are consequently left to cope with the emotional distress. The WHO has realised the impact that this is having on individuals and in an attempt to minimize the deleterious effects (of social distance on the physical well-being of minors), health professionals have developed guidelines for activities that can be performed at home depending on the reality of each family (WHO, 2020).

Irrespective of this, during a stressful experience like physical distancing, it is natural to have more fights among teenage and younger siblings and families (RCN, 2020). It was noted that quarantined children may get an increased risk of psychiatric disorders, and a higher risk of developing mood disorders, psychosis, and even suicide attempts (Liu et al., 2020). Teenagers may feel isolated from their friends and face major disappointments as graduations, seasons, and sporting events, and other planned events are cancelled or postponed. They may also experience frequent irritability, changes in weight or sleeping habits, repeated thoughts about an unpleasant event, and conflicts with friends and family (HC, 2020). As compensation, they may indulge in activities allowing for substance abuse, depression, risky sexual behaviours, and they may even suffer from post-traumatic stress disorder according to the CDC (2020).

Lastly, many adolescents may cope with the loneliness felt during the pandemic by binge eating. A recent study showed that school routines are important coping mechanisms specifically for young people with mental health issues (Lee, 2020). Furthermore, supporting studies show that periods without school are associated with decreased physical activity; increased screen time, irregular sleep patterns, and less appropriate diets in children and adolescents (Wang et al., 2020).

V. CONCLUSION

The sudden occurrence of the Covid-19 pandemic has generated undeniable changes in the mental health of adolescents. These individuals are experiencing higher rates of anxiety, depression, post-traumatic stress and eating disorders, compared to the years prior to the start of the pandemic. This is in

addition to the typical stressors associated with this age group. As a means to deal with this, adolescents may indulge in risky behaviours and several studies have noted behavioural changes including increased aggression. As stated before, adolescence is a formative period in an individual's life; the effects that they are facing now will possibly affect their futures. Although organisations such as the WHO are making efforts to protect and help these individuals, more needs to be done so that they do not continue to suffer the brunt of the pandemic.

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The Therapeutic use of Probiotics in Patients with Ulcerative Retocolitis: A Systematic Review

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Abstract- Ulcerative Colitis (UC) is considered a multifactorial disease, its prevalence and incidence may vary according to genetics, environment and intestinal microbiota, these factors alter the balance of the immune response of the intestinal mucosa and thus increase the inflammation reaction. The use of probiotics has been studied as a therapeutic form that can help in the balance of the intestinal microbiota along with drug therapy, which can contribute to the remission of the disease. The present study is a narrative literature review that aims to evaluate the effectiveness of probiotics in treatment of UC as part of the diet. The most relevant studies published on the subject between 2004 and 2021 were analyzed using the MEDLINE (Medical Literature Analysis and Retrieval System Online), SciELO (Scientific Electronic Library Online) and Cochrane Library databases. For the search strategy, the following combinations of keywords were used: ulcerative colitis, probiotics, inflammatory bowel diseases, gastrointestinal microbiome.

Keywords: *ulcerative colitis. probiotics. inflammatory bowel diseases. gastrointestinal microbiome.*

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THE THERAPEUTIC USE OF PROBIOTICS IN PATIENTS WITH ULCERATIVE RETOCOLITIS AS A SYSTEMATIC REVIEW

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The Therapeutic use of Probiotics in Patients with Ulcerative Retocolitis: A Systematic Review

O Uso Terapêutico Dos Probióticos Em Pacientes Com Retocolite Ulcerativa: Uma Revisão Sistemática

Daiane Alves Da Silva ^α, Jessica Machado Martins ^σ, Jéssica Reis Lemos De Souza ^ρ
& Mônica Fernandez ^ω

Resumo- A Retocolite Ulcerativa (RCU) é considerada como doença multifatorial sua prevalência e incidência pode variar de acordo com a genética, meio ambiente e microbiota intestinal, esses fatores alteram o equilíbrio de resposta imune da mucosa intestinal e assim aumentam a reação de inflamação. O uso dos probióticos vem sendo estudado como uma forma terapêutica que pode auxiliar no equilíbrio da microbiota intestinal junto com a terapia medicamentosa, podendo contribuir para a remissão da doença. O presente estudo é uma revisão bibliográfica narrativa que tem por objetivo avaliar a eficácia dos probióticos no tratamento terapêutico da RCU como parte da dieta. Foram analisados os mais relevantes estudos publicados sobre o tema no período de 2004 há 2021 tendo como referência as bases de dados MEDLINE (Medical Literature Analysis and Retrieval System Online), SciELO (Scientific Electronic Library On-line) e #FB Cochrane. Para estratégia de busca foi utilizado as seguintes combinações de palavras-chave: ulcerative colitis, probiotics, inflammatory bowel diseases, gastrointestinal microbiome. Para identificar os delineamentos dos estudos, foram empregados os seguintes termos: review e meta-analysis. Os critérios de inclusão e exclusão foram aplicados com base no resultado obtido no ensaio clínico em que evidenciavam notáveis melhoras na inflamação, característica da RCU, após o consumo de probióticos. Foram identificados 23 estudos envolvendo a eficácia dos probióticos no tratamento terapêutico da RCU. Contudo, apenas 13 preencheram os critérios de inclusão para esta revisão sistemática. Os estudos analisados envolveram 1.046 pacientes com idades entre 13 a 49 anos de ambos os gêneros. O presente estudo demonstrou que o uso do probiótico associado a terapia medicamentosa contribui significativamente para manutenção e remissão clínica da RCU, contribuindo beneficemente na melhora do paciente.

Palavras-chave: colite ulcerativa. probióticos. doenças inflamatórias intestinais. microbioma gastrointestinal.

Abstract- Ulcerative Colitis (UC) is considered a multifactorial disease, its prevalence and incidence may vary according to genetics, environment and intestinal microbiota, these factors alter the balance of the immune response of the intestinal mucosa and thus increase the inflammation reaction. The use of probiotics has been studied as a therapeutic form that can help in the balance of the intestinal microbiota along with drug therapy, which can contribute to the remission of the disease.

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The present study is a narrative literature review that aims to evaluate the effectiveness of probiotics in treatment of UC as part of the diet. The most relevant studies published on the subject between 2004 and 2021 were analyzed using the MEDLINE (Medical Literature Analysis and Retrieval System Online), SciELO (Scientific Electronic Library Online) and Cochrane Library databases. For the search strategy, the following combinations of keywords were used: ulcerative colitis, probiotics, inflammatory bowel diseases, gastrointestinal microbiome. To identify the study designs, the following terms were used: review and meta-analysis. The inclusion and exclusion criteria were applied based on the results obtained in the clinical trial in which they showed notable improvements in inflammation, characteristic of UC, after the consumption of probiotics. We identified 23 studies involving the efficacy of probiotics in the treatment of UC. However, only 13 met the inclusion criteria for this systematic review. The analyzed studies involved 1,046 patients aged 13 to 49 years of both genders. The present study demonstrated that the use of probiotics associated with drug therapy significantly contributes to the maintenance and clinical remission of UC, effectively contributing to in patient improvement.

Keywords: ulcerative colitis. probiotics. inflammatory bowel diseases. gastrointestinal microbiome.

I. INTRODUÇÃO

As doenças intestinais acometem pessoas de todos os gêneros, idades e níveis socioeconômicos afetando aproximadamente 1,4 milhões de pessoas nos Estados Unidos, 2,2 milhões na Europa e cerca de 150 mil pessoas da população canadense. A Retocolite Ulcerativa (RCU) é a doença intestinal com prevalência no Estado de São Paulo entre os anos de 2012 a 2015 de 12.187 casos / 100.00 habitantes com média de 53,84% com idades entre 1 a 97 anos, com maior prevalência no sexo feminino (59,70%)^{1,2}. A RCU é considerada como doença multifatorial sua prevalência e incidência pode variar de acordo com a genética, meio ambiente e a microbiota intestinal, esses fatores alteram o equilíbrio de resposta imune da mucosa intestinal e assim aumenta a reação de inflamação³. Esse processo inflamatório pode se iniciarno reto distal, podendo se estender para segmentos colônicos proximais, até o total acometimento do intestino grosso, manifestações

clínicas como diarreia, hemorragia e dor abdominal são geralmente observadas⁴. Pacientes com RCU extensa apresentam frequentemente febre, emagrecimento, perda sanguínea significativa e dor abdominal. Em até 10% dos casos, a apresentação ocorre com manifestações extraintestinais que afetam de 10 a 30% dos pacientes e pode acarretar acometimento articular, cutâneo, hepatobiliar, oftalmológico e hematológico e influenciar no metabolismo ósseo⁵. As manifestações de inflamação e períodos de remissão podem ser preservadas com medicamentos com propriedades anti-inflamatórias e / ou imunossuppressores ou biológicos. Estudos apontam que o uso dos probióticos com o objetivo de agir na microbiota do trato gastrointestinal em parceria com a terapia medicamentosa ajudam na remissão da RCU⁶. De acordo com a Organização Mundial da Saúde (OMS)⁷, os probióticos são descritos como micro-organismos vivos que ao serem administrados em quantidades adequadas, promovem o equilíbrio entre os diversos tipos de bactérias da microbiota intestinal, proteção contra invasores patogênicos, estimulação do sistema imunológico, diminuem as citocinas pró-inflamatórias, melhoram a absorção e digestão dos nutrientes e podem promover melhora dos sintomas gastrointestinais como dor, distensão abdominal e diarreia. As principais bactérias que compõem a microbiota entérica são benéficas e/ou probióticas como por exemplo Bifidobactérias e Lactobacilos. Também encontramos as bactérias nocivas como por exemplo as *Enterobacteriaceae* e *Clostridium spp*⁸. Os probióticos produzem alguns componentes como ácidos orgânicos que diminuem o pH intestinal, e atrasam o crescimento de bactérias patogênicas sensíveis a estes compostos⁹. A ingestão de probióticos gera a produção de imunoglobulina A (IgA) capaz de neutralizar a adesão de patógenos a mucosa intestinal. Esse processo é capaz de estimular a expressão de IL-10, uma potente citocina anti-inflamatória, bem como estimular a expressão de TGF- β , uma citocina que participa da diferenciação de linfócitos B em plasmócitos produtores de IgA^{7,10,11}. Os probióticos também são apontados como recrutadores de células Natural Killer (NK), macrófagos, essas células

desempenham importante papel na resposta imune, como fagócitos, (macrófagos) e na vigilância imunológica contra células tumorais e células infectadas por vírus¹⁰. Esta revisão sistemática tem como objetivo avaliar a eficácia dos probióticos no tratamento terapêutico da RCU como parte da dieta, auxiliando no equilíbrio da microbiota intestinal associado a terapia medicamentosa, podendo contribuir para a remissão da doença.

II. OBJETIVO

Avaliar por meio de uma revisão sistemática a eficácia dos probióticos no tratamento terapêutico da RCU auxiliando no equilíbrio da microbiota intestinal associado a terapia medicamentosa, podendo contribuir para a remissão da doença.

III. MÉTODOS

Foram analisados os mais relevantes estudos publicados sobre o tema no período de 2004 há 2021 tendo como referência as bases de dados MEDLINE (Medical Literature Analysis and Retrieval System Online), SciELO (Scientific Electronic Library On-line) e Biblioteca Cochrane; Para estratégia de busca foi utilizado as seguintes combinações de palavras-chave: ulcerative colitis, probiotics, inflammatory bowel diseases, gastrointestinal microbiome. Para identificar os delineamentos dos estudos, foram empregados os seguintes termos: review e meta-analysis. Os critérios de inclusão e exclusão foram aplicados com base no resultado obtido no ensaio clínico em que evidenciavam notáveis melhoras na inflamação, característica da RCU, após o consumo de probióticos.

IV. RESULTADOS

Foram identificados 23 estudos envolvendo a eficácia dos probióticos no tratamento terapêutico da RCU. Contudo, apenas 13 preencheram os critérios de inclusão para esta revisão sistemática. Os estudos analisados envolveram 1.046 pacientes com idades entre 13 e 49 anos de ambos os gêneros. Na tabela 1 estão descritos os 13 estudos que compõem essa revisão sistemática.

Tabela 1: Sumário dos trabalhos

ESTUDO	PACIENTES	CEPA DURAÇÃO	RESULTADOS
Hai-Hong RCUi et.al, 2004 ⁽¹⁴⁾	30 pacientes. GI-15 GC -15	BIFIC (Bífida tripla vaiável) e placebo - 8 semanas	Foi eficaz para inibir mediadores inflamatórios, melhorar a resposta imunológica e inflamatória no intestino, prevenir a recaída e manter a remissão da RCU.
Kato.K, et al. 2004 ⁽¹³⁾	20 pacientes. GI - 10 GC - 10	Bifidobactérias e placebo - 12 semanas	Eficaz, bem tolerado e seguro para paciente com RCU ativa de forma leve ou moderada melhorando significativamente os sintomas e remissão da doença.
W.Kruis, et.al. 2004 ⁽¹¹⁾	327 pacientes. GI -162	E. coli Nissle 1917 (200mg 1x/dia) Mesalazina (3 x ao dia)	A análise por protocolo revelou recaídas em 36,4% pacientes no grupo E coli. E 33,9% no

	GC – 165	– 12 meses	grupo mesalazina. O probiótico E coli Nissle 1917 apresenta eficácia e segurança na manutenção da remissão equivalente à mesalazina.
Hegazy.K.S, et.al., 2010 ⁽¹⁰⁾	30 pacientes. GI- 15 GC - 15	Lactobacillus delbruekii e Lactobacillus fermentum e placebo – 8 semanas	Melhorou significativamente a inflamação, diminuindo a concentração colônica de IL-6, expressão de TNF- α e NF- κ B p65. A suplementação oral pode ser benéfica para preservar a remissão e prevenir a recidiva da RCU.
S. Santana Porbén, 2010 ⁽¹⁹⁾	30 pacientes. GI 29 GC 21	4 lactobacilos (L.rhamnosus, L. plantarum, L. casei, L. acidophilus) + 1 bifidobactéria (Bifidobacterium infantis) - 38 dias	O uso dessa combinação de probióticos ajudou na diminuição da atividade da doença, mudança na atividade clínica, aumento de peso corporal.
Tursi, A. MD, et al. 2010 ⁽⁴⁾	144 pacientes. GI - 71 GC -73	VSL#3 – 8 semanas	É segura e capaz de reduzir os escores UCDAI UCDAI (DiseaseActivity Index (DAI) for UlcerativeColitis- Um Índice de Atividade da Doença via endoscópica para Colite Ulcerativa) em pacientes afetados por recidiva de RCU leve a moderada que estão sob tratamento com 5-ASA e / ou imunossuppressores. Melhora o sangramento retal após 8 semanas de tratamento, embora esses parâmetros não alcancem significância estatística.
S. Oliva, et al,2011 ⁽¹⁵⁾	31 pacientes. GI- 16 GC -15	Lactobacillus reuteri ATCC 55730 placebo – 8 semanas	O uso de infusão retal mostrou eficácia na melhora da inflamação da mucosa em crianças com RCU distal ativa. Serão necessários alguns estudos para comprovar se a administração oral terá a mesma eficácia da infusão retal.
Andreas .M.P, et.al., 2014 ⁽²⁰⁾	100 pacientes 4grupos distribuídos aleatoriamente	Bactéria probiótica Escherichia placebo E.coliNissle 1917 – 12 semanas	Não houve benefícios como um tratamento complementar as terapias convencionais para colite ulcerativa ativa.
Yoshimatsu Y, et.al ,2015 ⁽¹²⁾	46 pacientes GI – 23 GC - 23	Probiótico BIO THREE(Streptococcus faecalis T-110, Clostridium butyricum TO-A e Bacillus mesentericus TO-A) placebo - 12 meses.	Podem ser eficazes para manter a remissão clínica em pacientes com RCU , em 12 meses foi possível identificar uma taxa de remissão de 69,5% no grupo probiótico e 56,6% no grupo placebo
Palumbo.D.V, et al, 2016 ⁽¹⁶⁾	60 pacientes. GI -30 GC -30	Lactobacillus salivarius, Lactobacillus acidophilus e Bifidobacterium bifidus cepa BGN4 Placebo - 24 meses.	Foi comprovada a eficácia no tratamento da RCU a longo prazo, mostrando a melhora da atividade da doença principalmente associado ao tratamento com antiinflamatórios
Tamaki.H, et al, 2016 ⁽¹⁸⁾	56 pacientes. GI 28 GC 28	Bifidobacterium longum 536 (BB536) -8 semanas	No total, 63% dos pacientes apresentaram remissão clínica (índice de atividade da doença RCU [UCDAI] \leq 2) e 52% dos que receberam placebo (P = 0,395). Houve também uma diminuição significativa no índice endoscópico de Rachmilewitz (EI) e no subtotal de Mayo, ao passo que não houve diminuição significativa no grupo placebo.
Chen.P, et al, 2020 ⁽¹⁷⁾	25 pacientes. GI 12 GC 13	Zhang, Lactobacillus plantarum P-8 Bifidobacterium animalis subsp. LactisV9 placebo – 12 semanas	Melhora clínica do tratamento da RCU ativa, houve melhora dos sintomas clínicos e mudanças na composição da microbiota da mucosa intestinal.
Qiang Ou, et al, 2021 ⁽²¹⁾	147 pacientes. GI 74	Bifidobacterium Bifidobacterium	A suplementação de probióticos combinados com plataforma WeChat mostrou efeito



	GC 73	Enterococcus Lactobacillus acidophilus. – 12 semanas	significante no estado nutricional dos pacientes, reduziu os níveis de marcadores inflamatórios e melhora na qualidade de vida dos pacientes com RCU.
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V. DISCUSSÃO

Estudos com probióticos mostram que a recuperação da microbiota intestinal, melhora dos sintomas, remissão e inibição das inflamações no intestino, contribuem e auxiliam beneficamente o paciente, melhorando seu estado nutricional, atuando diretamente na recuperação intestinal e mantendo a remissão da RCU, além da prevenção do surgimento de células tumorais e de serem um protetor antineoplásico¹¹. O estudo de Yoshimatsu Y, et.al 2015¹², teve uma duração de 12 meses com 60 participantes, onde apenas 76% dos pacientes permaneceram até o final do estudo. Desses pacientes, todos estavam em estado de remissão da doença, 23 participavam do grupo com uso de corticoides em associação com o probiótico BioThree (Streptococcus Faecalis, Clostridium Butyricum e Bacillus Mesentericus) e 23 participavam do grupo controle placebo. Desses dois grupos 7 pacientes do grupo BioThree apresentaram recaídas da doença, enquanto 10 pacientes placebo apresentaram recaídas. Devido a maior durabilidade do estudo, 12 meses, as recaídas puderam ser melhor avaliadas. Mesmo com as recaídas no grupo de uso BioThree o estudo ainda pôde provar que a terapia com o probiótico apresenta benefícios se comparada a terapia apenas com o uso de corticoides.

Tursi Antonio MD. et al. 2010⁴. demonstrou que pacientes em tratamento de RCU com imunossupressores em associação ao VSL#3 (L. paracasei, L. plantarum, L. acidophilus e L. delbrueckii subsp. bulgaricus, bifidobactérias, B. longum, B. breve, e B. infantis, Streptococcus thermophilus), tiveram melhora com relação ao seu estado de saúde após a aplicação do protocolo de atendimento durante 8 semanas que proporcionou uma alteração da resposta imune desses pacientes. O estudo contou com 144 pacientes participantes, dos quais 49% foram do grupo intervenção, que receberam o probiótico e o restante recebeu placebo. Finalizaram o estudo 45% pacientes do grupo intervenção. A remissão de atividade da doença no grupo VSL# 3 foi maior que no grupo placebo, 63,1% a 40,8% respectivamente.

Tanto no estudo de Tursi Antonio MD. et al. 2010⁴ como no estudo de W. Kruis, et.al 2004¹¹ os pacientes obtiveram êxito no tratamento da RCU, este último com maior número de participantes, fato que pode contribuir para aumentar o campo de investigação e efetividade do tratamento com probióticos.

O estudo de Hegazy.K.S, El- Bedewy.M.M et.al, 2010¹⁰, mostrou que o tratamento medicamentoso associado ao terapêutico na RCU, eleva a qualidade de vida dos pacientes, causando menos efeitos colaterais

por consumo prolongado do medicamento. Foram selecionados 30 pacientes com RCU grave e moderada, com diarreia crônica presente. Esses foram divididos em dois grupos, intervenção e placebo. O grupo placebo não apresentou nenhuma alteração nas células da mucosa. O grupo intervenção apresentou pausa na extensão das células inflamadas, e proporcionou o alívio da RCU.

Outro estudo que demonstrou uma melhora do quadro clínico dos pacientes foi o de W. Kruis, et.al 2004¹¹ que utilizou o Probiótico ECN (E. Coli Nissle 1917), contou com 327 participantes separados em 4 grupos (recebendo a combinação de ECN + Corticoide, Corticoide + Placebo, Placebo + ECN ou Placebo + Placebo). Os pacientes do estudo estavam em remissão da doença e o estudo procurou provar que o probiótico apresenta eficácia e segurança na manutenção e remissão da RCU. Após 12 meses de estudo comprovou-se a efetividade desse probiótico em associação do corticoide na melhora do quadro de saúde desses pacientes.

O estudo de Kato.K, et al. 2004¹³, demonstrou ação benéfica no uso dos probióticos em pacientes com RCU na fase ativa, entretanto o estudo apresentou um número reduzido de participantes. O número reduzido de participantes, apenas 20, pode colocar em dúvida a efetividade do tratamento com a combinação das Bifidobactérias (Bifidobacterium breve Yakult, Bifidobacterium Bifidum Cepa e Lactobacillus acidophilus) e corticoides.

Segundo estudo Hai-Hong RCUi et.al, 2004¹⁴, as cepas da família Lactobacillus e Bifidobacterium, mostraram resultados positivos nas pesquisas, promovendo a remissão da RCU. Estes gêneros de microorganismos habitam a microflora entérica do intestino, e, ao serem inseridos no tratamento, levam o indivíduo que as consome a ter uma flora intestinal diversificada e reconstruída, que por sua vez, atua na regeneração da parede intestinal inflamada e danificada devido a colite ulcerativa. No estudo, o número de pacientes estudados foi escasso, em um número de 30 pessoas com RCU ativa. Esses indivíduos foram divididos em grupo intervenção, recebendo um fermentado de Bifidobactérias (Bifidobacterium breve Yakult, Bifidobacterium Cepa e Lactobacillus acidophilus) com medicação esteróide e antibióticos e o grupo placebo, recebendo esteróides e antibióticos. Com duração de 12 semanas o estudo comprovou que os pacientes que receberam os probióticos mais medicação, obtiveram uma melhora nos sintomas da RCU.

De acordo com S. Oliva, et al¹⁵, o tratamento feito por citocinas L. reuteri ATCC 55730 aumentou

beneficamente o estado de remissão da RCU. O estudo mostrou a eficácia do enema com probiótico em associação a medicação via oral padrão. Estes probióticos aceleram o processo de desinflamação da mucosa retal.

Nos estudos de Hai-Hong RCUj, et.al, 2004¹⁴ Hegazy. K.S, El-Bedewy.M.M et.al, 2010¹⁰, e Qiang Ou, et. Al, 2021²¹, os pacientes foram distribuídos em grupo placebo e grupo probiótico com utilização de CEPAS diferentes (Cápsula tripla BIFICO Lactobacille), Enterococcus, Bifidobacteria e Lactobacillus delbruekii e Lactobacillus fermentum, Bifidobacterium, Enterococcus e Lactobacillus acidophilus) em associação a medicação com Sulfasalazina ou Glicocorticoides, todos os estudos apresentaram êxito na melhora do quadro dos pacientes com RCU. O total de participantes dos 3 estudos foi de 147 pacientes, desse total 71% faziam parte do grupo intervenção, sendo tratados com probiótico em associação com fármacos antimicrobianos ou glicocorticoides, 97,11% dos pacientes do grupo intervenção apresentaram melhora do quadro de RCU. Nesses estudos também os pesquisadores conseguiram comprovar por meio de biomarcadores que os probióticos podem prevenir a ativação de citocinas pró inflamatórias como a NF- κ B e diminuir a expressão de TNF- α , Interleucina 1-B e elevar a expressão de IL-10, podemos observar que essas cepas probióticas podem reduzir não somente os sintomas da RCU como também biomarcadores próprios de pacientes com algum processo inflamatório.

No estudo de Palumbo.D.V 2016¹⁶, 60 pacientes, de ambos os gêneros foram submetidos ao tratamento do estudo, 50% dos pacientes fizeram uso de corticoides e mistura probiótica de Lactobacillus salivarius, Lactobacillus acidophilus e Bifidobacterium bifidus cepa BGN 4 e 50% dos pacientes receberam corticoides em associação ao placebo. O estudo com duração de 24 meses, apresentou resultados positivos, todos os pacientes que receberam a mistura probiótica apresentaram melhora durante o período do estudo, comprovando a capacidade anti-inflamatória da cepa usada no tratamento quando em associação ao uso dos corticoides.

Um estudo japonês feito por Chen.P, et al¹⁷ utilizou duas vezes ao dia mesalazina e uma combinação de cepas de probióticos contendo Lactobacillus casei Zhang, Lactobacillus plantarum P-8 e Bifidobacterium animalis subsp. LactisV9. Após 12 semanas, concluiu-se que os pacientes que receberam as cepas com os probióticos apresentaram melhora na inflamação, inclusive o aumento de microorganismos benéficos na microbiota intestinal. A quantidade de Weissella aumentou consideravelmente, esta que é uma bactéria que supre o estresse pro inflamatório, foi considerada então, uma resposta imunológica. A

frequência de fezes e sangramento retal também foi diminuída.

Pacientes orientais apresentam maior risco ao desenvolvimento da RCU devido a ocidentalização da dieta e a pré-disposição genética. No estudo de Tamaki.H, et al 2016¹⁸, 56 pacientes orientais foram submetidos ao estudo de grupo controle e placebo, sendo usado o probiótico BB536 (Bifidobacterium longum 536) durante 8 semanas de estudo. Os pacientes que possuíam RCU leve a moderada, obtiveram melhora, mas não sem a colaboração e associação dos medicamentos 5-ASA, Prednisolona, Azatioprina, 6-Mercaptopurina oral. Todos os estudos mencionados durante a discussão dessa revisão fizeram uso de medicamentos imunomoduladores e corticoides em associação aos probióticos para o tratamento dos pacientes com RCU.

Santana.S.P, 2010¹⁹ mostrou que após os 36 dias de tratamento com combinação de lactobacilos + bífido bactérias, foi observado melhora no controle da inflamação e do hábito intestinal, o que resultou em uma melhora do estado nutricional. O uso dos probióticos trouxe uma diminuição na frequência das evacuações, desaparecimento das evacuações noturnas, redução no volume das fezes e um aumento em sua consistência obtendo um resultado melhor que apenas o uso de medicação para o controle. A teoria do pesquisador é que o uso dos probióticos pode resultar em uma diminuição de marcadores inflamatórios como o VHS.

O estudo de Andreas.M.P, et. Al de 2014²⁰, estudou uso de tratamento coadjuvante de ECN (E. Coli Nissle). Pacientes que receberam EcN em combinação com Ciprofloxacina ou apenas EcN, obtiveram uma menor remissão, maiores efeitos colaterais e resultados piores em comparação com os pacientes que receberam placebo ou apenas tratamento médico convencional. O estudo, no entanto, não exclui a possibilidade de que esse probiótico seja eficiente em subgrupos de paciente em associação com outras drogas ou precedidas de antibióticos.

De acordo com o estudo realizado por W.Kruis, et.al 2004¹¹ o uso do probiótico Escherichia coli Nissle 1917 apresenta eficácia terapêutica e segurança na manutenção da remissão no tratamento da RCU comparado com o uso do medicamento mesalazina. O uso da Escherichia coli Nissle 1917 pode ser considerado uma alternativa para o uso da mesalazina. O estudo de Bjarnason, I. et al de 2019²³, um ensaio clínico, duplo cego, controlado por placebo onde participaram pacientes com Doenças Inflamatórias Intestinais (DII), foram recrutados 500 pacientes para o estudo, dentre esses, 60% possuíam RCU, o probiótico utilizado foi o Symprove, composto de 4 cepas (Lactobacillus rhamnosus NCIMB 30174, Lactobacillus plantarum NCIMB 30173, Lactobacillus acidophilus NCIMB 30176 em NCIMB 30175 e Enterococcus RCUs).

Para avaliar a efetividade da melhora dos pacientes, além da remissão dos sintomas foi aplicado um Questionário de Qualidade de vida (CLQ), hemograma completo, função renal e hepática e avaliação da proteína C-reativa (CRP), velocidade de hemodissedimentação (VHS) e Calprotectina fecal (FCAL). Houve melhora nos marcadores inflamatórios dos pacientes, demonstrando que o probiótico pode ser usado em associação a medicação específica em pacientes com RCU para a redução de FCAL, mas ainda são necessários mais estudos para confirmar sua eficácia na prevenção de recidiva clínica.

VI. CONCLUSÃO

O uso do probiótico associado ao tratamento medicamentoso modula o sistema imunológico, melhora a recuperação da microbiota intestinal, melhora os sintomas, contribuem e auxiliam beneficamentena saúde do paciente, melhorando seu estado nutricional, atuando diretamente na recuperação intestinal e mantendo a remissão da RCU. A administração dos probióticos cria uma memória imunológica, fazendo com o que a flora consiga reconhecer e combater os agentes inflamatórios da RCU. O uso de probióticos têm grande potencial no controle e tratamento da RCU, mas depende de uma utilização correta em associação a drogas farmacológicas que ajudem a controlar a doença e a melhorar a qualidade de vida dos pacientes portadores da doença.

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Assessment of Image of CT Scan for Patient with COVID-19

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Abstract- COVID-19 is a virus that can cause disease. Phylogenetic analysis Bats have been discovered to have a full genome sequence, according to research done with available entire genome sequences. The COVID-19 virus reservoir has been identified, however the intermediate host(s) has yet to be identified now. This study was conducted in Marjan Teaching Hospital in Babylon for all patients infected with Covid 19 disease during January of 2022 and their ages were between 30-55, where the diagnosis was made by CT-scan. The reports that I will mention that the new mutation from Corona does not cause severe damage to the lung, and the infection rate is less than 45% in the lung. She also indicated that all patients were exposed to severe diarrhea without losing the sense of smell and taste. From this, we conclude that the new mutations in Covid-19 are Less severe and less severe, and the vaccine reduces a high rate of infection, as most of the vaccinated people had a very weak rate. And here are pictures of the reports of the new mutant from Covid-19 (OMICRON).

Keywords: Covid-19, ct-scan, report.

GJMR-K Classification: DDC Code: 614.57 LCC Code: RC114.5



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Keywords: Covid-19, ct-scan, report.

I. INTRODUCTION

The current pneumonia outbreak, which began in early December 2019 near Wuhan, is caused by a novel coronavirus (CoV) known as '2019-nCoV' or '2019 novel coronavirus' or 'COVID-19' by the World Health Organization (WHO). [1–4] City, Hubei Province, China. COVID-19 is a virus that can cause disease. Phylogenetic analysis Bats have been discovered to have a full genome sequence, according to research done with available entire genome sequences. The COVID-19 virus reservoir has been identified, however the intermediate host(s) has yet to be identified. Now. Though three primary areas of work to a other marketplaces in the vicinity, as well as the gathering of thorough details on the origins and types of wildlife species marketed on the Huanan market, and the animals' final destination after the market [5–8] has been completed.

Coronaviruses are naturally divided into four categories that cause gastrointestinal and respiratory infections: Gammacoronavirus, Deltacoronavirus, Betacoronavirus, and Alphacoronavirus [9–11]. The first two types primarily affect birds, while the third and fourth types primarily affect mammals. Human CoVs have

been classified into six categories. These include the Beta corona viruses HCoV HKU1, HCoV-OC43, Middle East Respiratory Syndrome coronavirus (MERS-CoV), Severe Acute Respiratory Syndrome coronavirus (SARS-CoV), HCoV229E, and HCoV-NL63, as well as the Alphacoronaviruses HCoV229E and HCoV-NL63. Coronaviruses were not widely recognized until the 2003 SARS pandemic [12–14], which was followed by the MERS outbreaks in 2012 [15–17] and, most recently, the COVID-19 outbreaks. SARS-CoV and MERS-CoV are highly dangerous viruses that move from bats to palm civets and dromedary camels, and then to humans.

COVID-19 is transferred via dust particles and fomites when people come into close contact with them between the infector and the person who has been infected. COVID-19's airborne distribution has not been recorded, and it is not known to be a substantial transmission engine based on empirical evidence; nonetheless, it is possible that such aerosol-generating organisms could be a significant transmission engine. Medical facilities are used to carry out the procedures. The spread of feces has been observed in a tiny number of clinical cases, and the active virus has been reported in a small number of cases.

Furthermore, it does not appear that the faecal-oral route is a COVID-19 transmission engine; its function and relevance for COVID-19 must be determined. The greatest number of patients (77.8%) for roughly 18,738,58 laboratory-confirmed cases registered as of the second week of April 2020 was between 30 and 69 years of age. 21.6 percent of the cases are farmers or employees by occupation, 51.1 percent are men, and 77.0 percent are Hubei.

However, there are already a lot of worries about the new coronavirus. Despite the fact that it appears to be transmitted to people by animals, it is critical to distinguish between particular animals and other sources, the channel of transmission, the incubation period, the characteristics of the susceptible community, and the survival rate. Despite this, there is currently very little clinical knowledge about COVID-19 disease, and details on age range, the virus's animal origin, incubation time, outbreak curve, viral spectroscopy, dissemination pathogenesis, autopsy observations, and any clinical responses to antivirals are lacking among the serious cases.

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II. PATIENT AND METHOD

This study was conducted in Marjan Teaching Hospital in Babylon for all patients infected with Covid 19 disease during January of 2022 and their ages were between 30-55, where the diagnosis was made by CT-scan, where the most important symptoms of the patients were high body temperature, chest pain, Diarrhea, loss of appetite, loss of sense of smell and taste, tiredness, fatigue

a) CT (Computed Tomography) Scan (Philips Brilliance CT 64 slice)

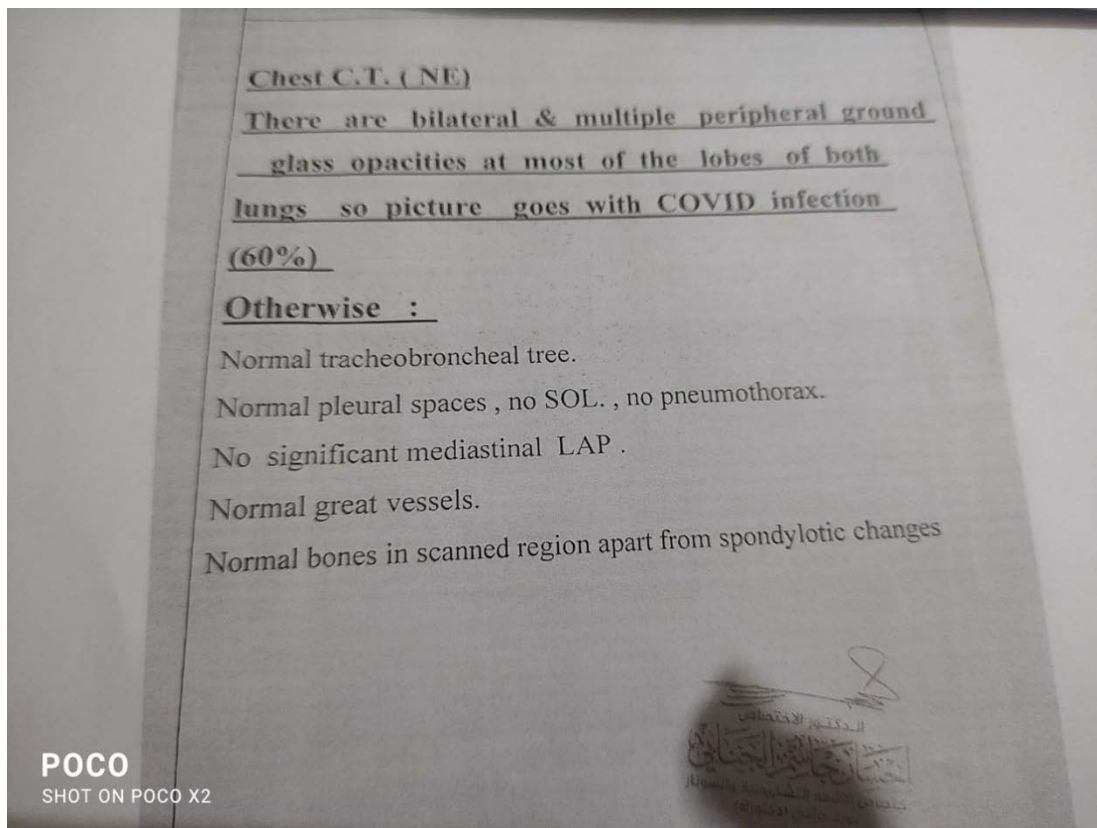
Doctors and other healthcare professionals have years of training in their field, but there are still many things they can't diagnose simply by looking at or listening to your body. Certain medical conditions require a deeper look, usually at the tissues, blood vessels, and bones inside your body. X-rays and ultrasounds can provide some information, but when a more detailed view is required, a computed tomography (CT) scan is usually the next step. In this article, we take a closer look at how a CT scan works, what it's typically used for, and what the procedure is like.

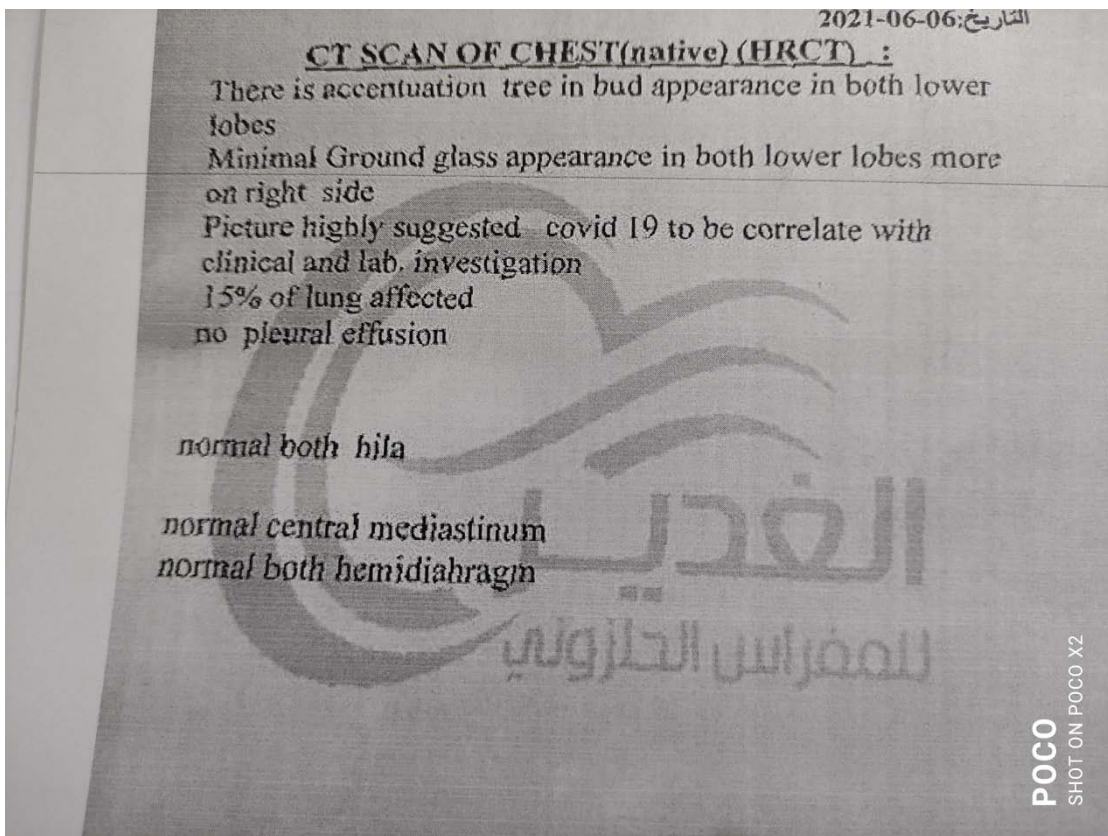
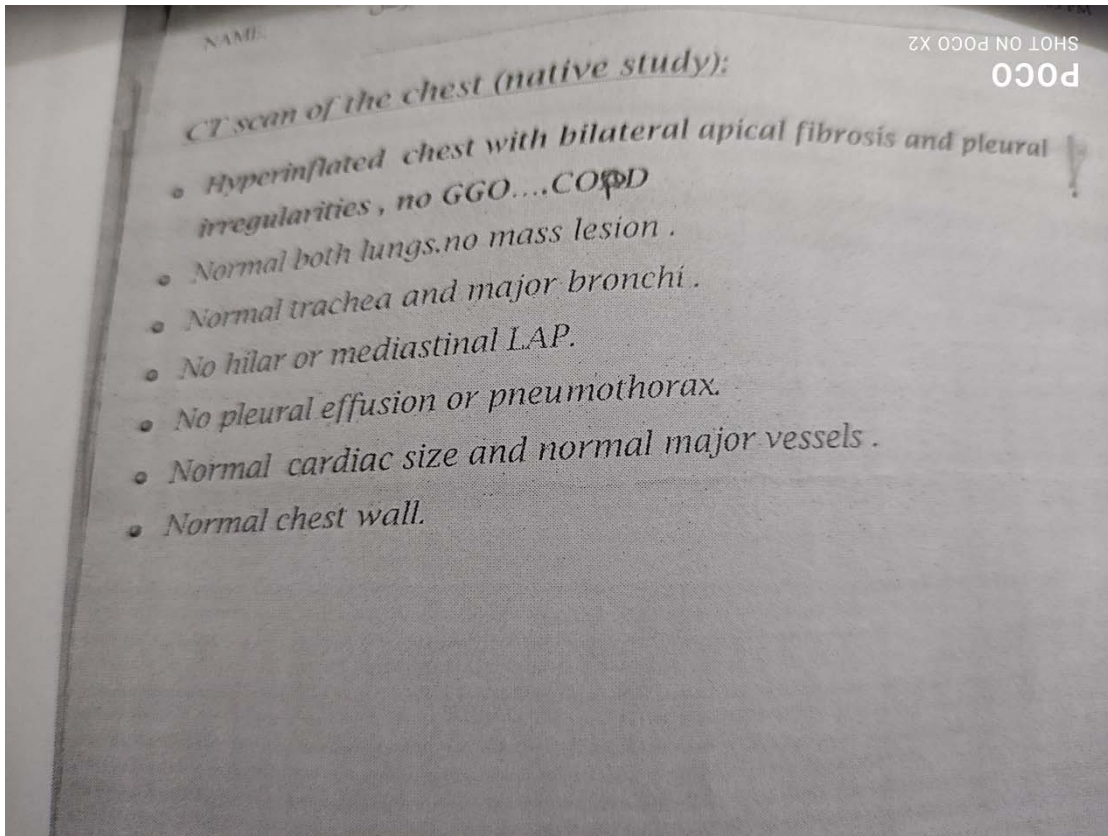
CT scans don't require much preparation. If needed, you can do a CT scan with or without contrast very quickly. In fact, this happens in most cases where a CT scan is needed to diagnose traumatic injuries or a stroke. If you're scheduled for a CT scan with contrast dye, it may help to refrain from eating solid foods for up to 4 hours before your test. This is especially true if your CT scan is being done to get images of your abdomen.

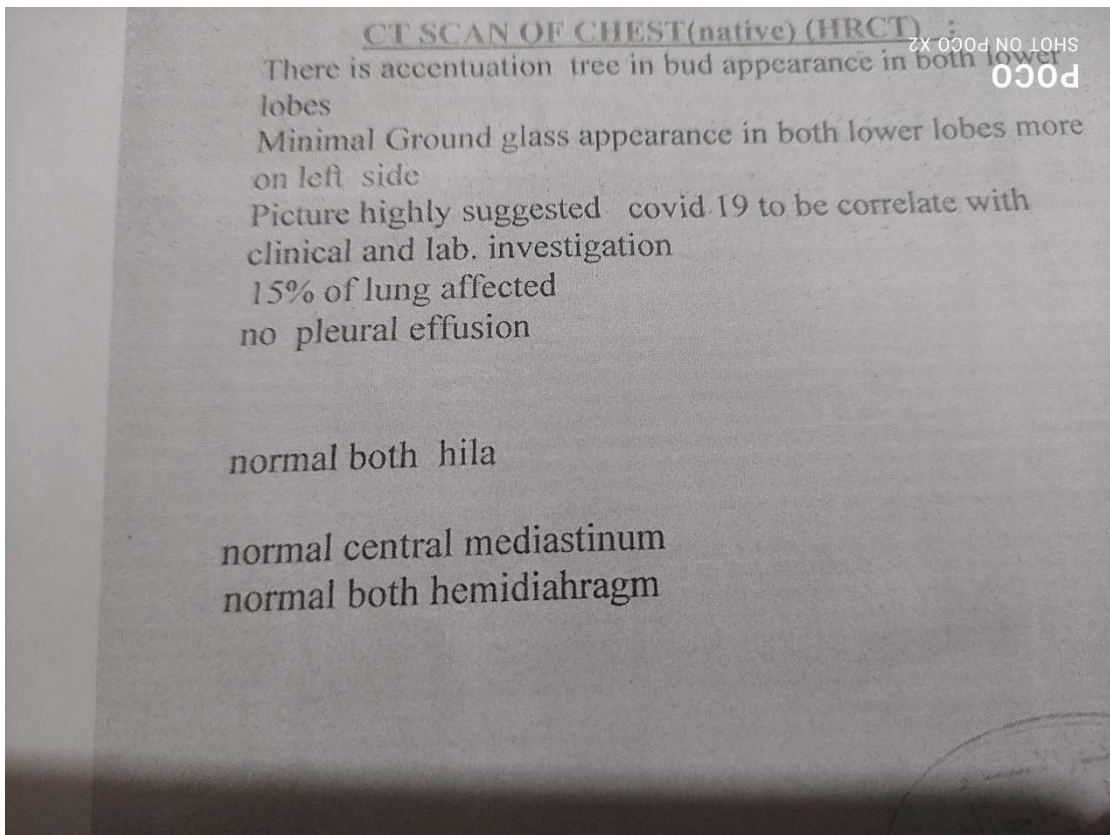
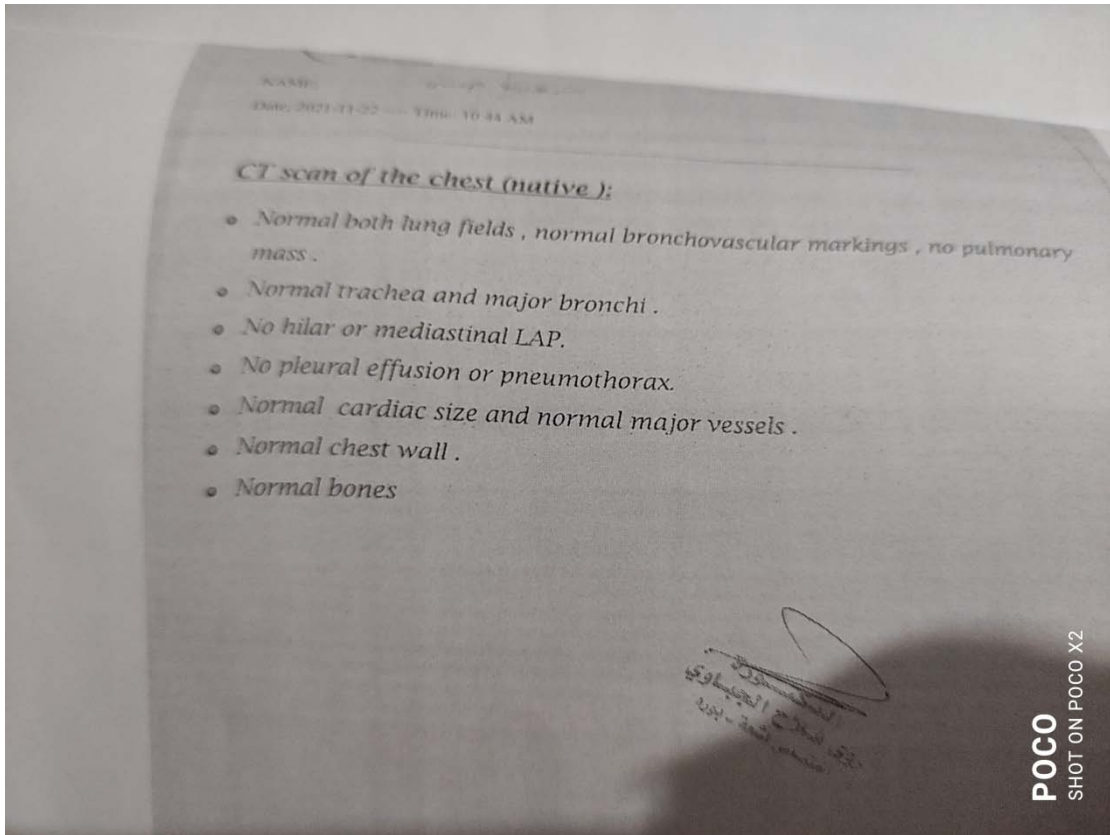
If your doctor is using oral contrast for your CT scan, you'll probably be given the contrast before the day of your scan and instructed on how to prepare and drink it. Generally, you will want to start drinking the solution within an hour or two of your scan, drinking a portion of the solution every 15 minutes. Your doctor or radiologist will give you specific instructions. If you're having intravenous (IV) contrast, a catheter will be inserted into your vein when you arrive at the testing facility. Otherwise, the only preparations you need to take before a CT scan are to remove metallic objects and medication devices from your body.

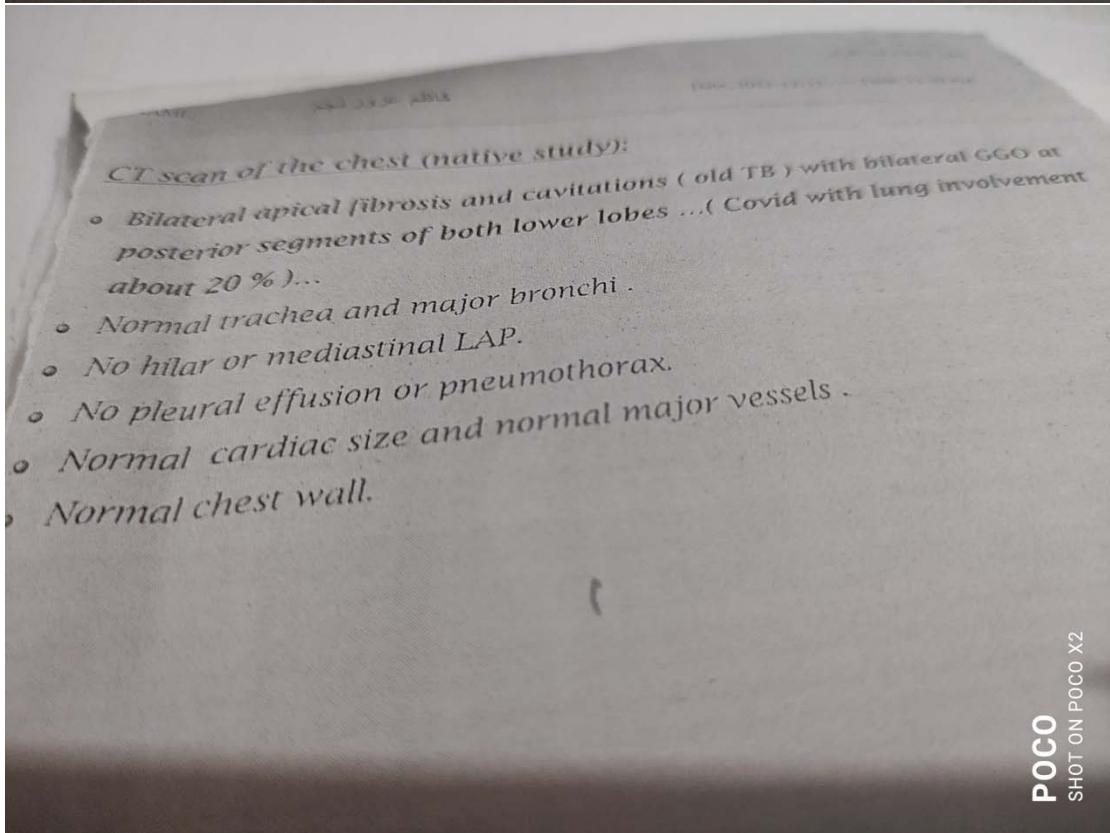
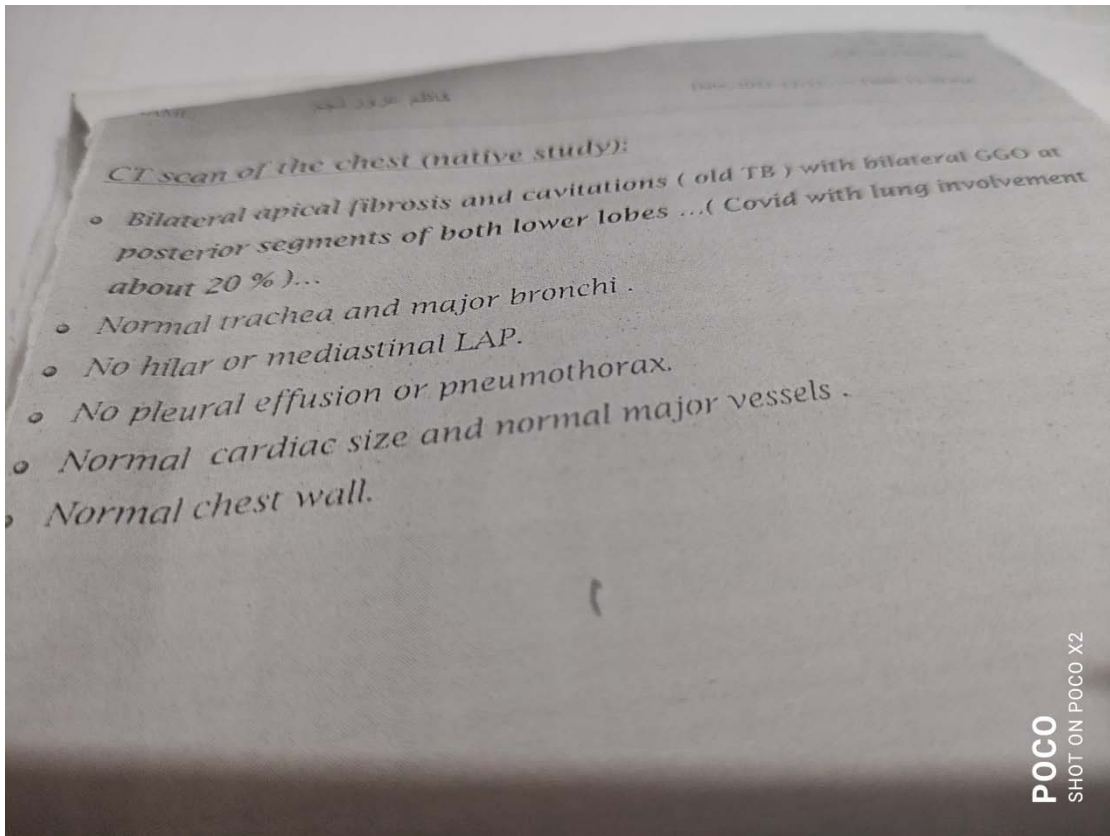
III. RESULT AND DISCUSSION

At the beginning of 2022, most countries were exposed to the new mutation of Covid-19, where the reports of those infected with Covid-19 were collected, and I will present them in the results. It included either lying down and receiving treatment in the hospital or outside it. Through the reports that I will mention that the new mutation from Corona does not cause severe damage to the lung, and the infection rate is less than 45% in the lung. She also indicated that all patients were exposed to severe diarrhea without losing the sense of smell and taste. From this, we conclude that the new mutations in Covid-19 are Less severe and less severe, and the vaccine reduces a high rate of infection, as most of the vaccinated people had a very weak rate. And here are pictures of the reports of the new mutant from Covid 19 (OMICRON).









CT scan of the chest (native study):

- Bilateral apical fibrosis and cavitations (old TB) with bilateral GGO at posterior segments of both lower lobes ... (Covid with lung involvement about 20 %)...
- Normal trachea and major bronchi .
- No hilar or mediastinal LAP.
- No pleural effusion or pneumothorax.
- Normal cardiac size and normal major vessels .
- Normal chest wall.

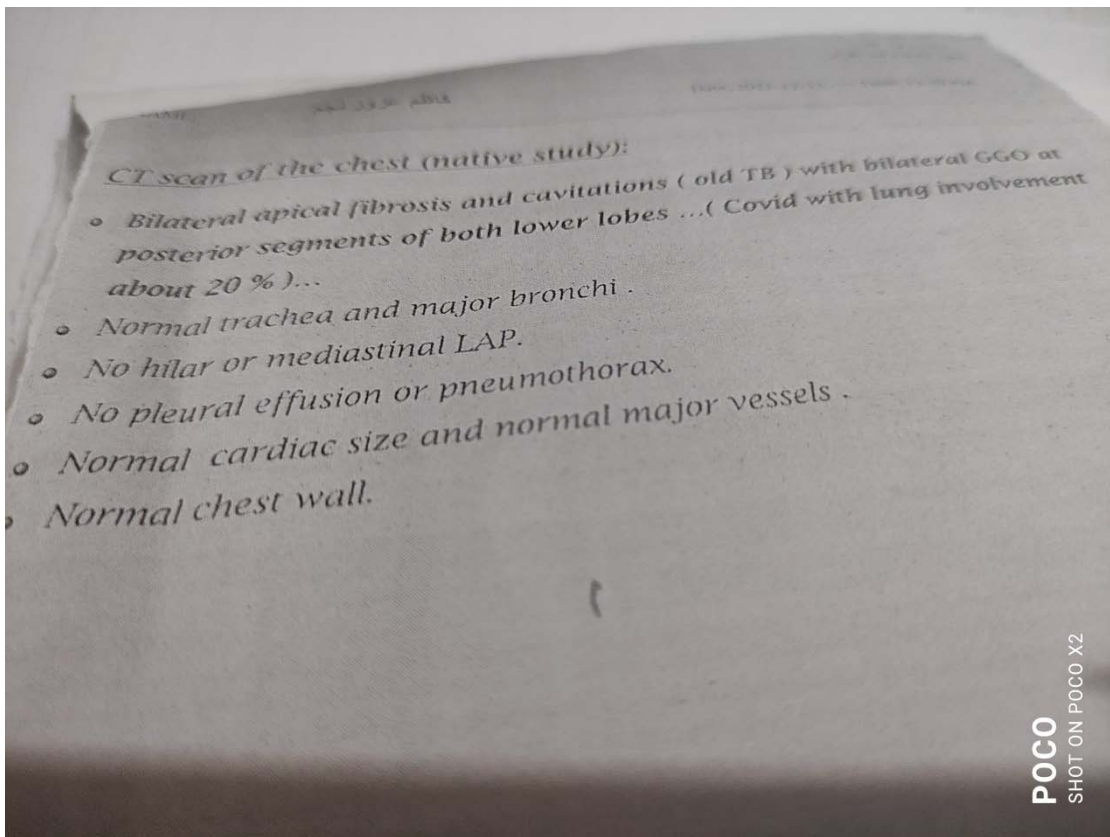
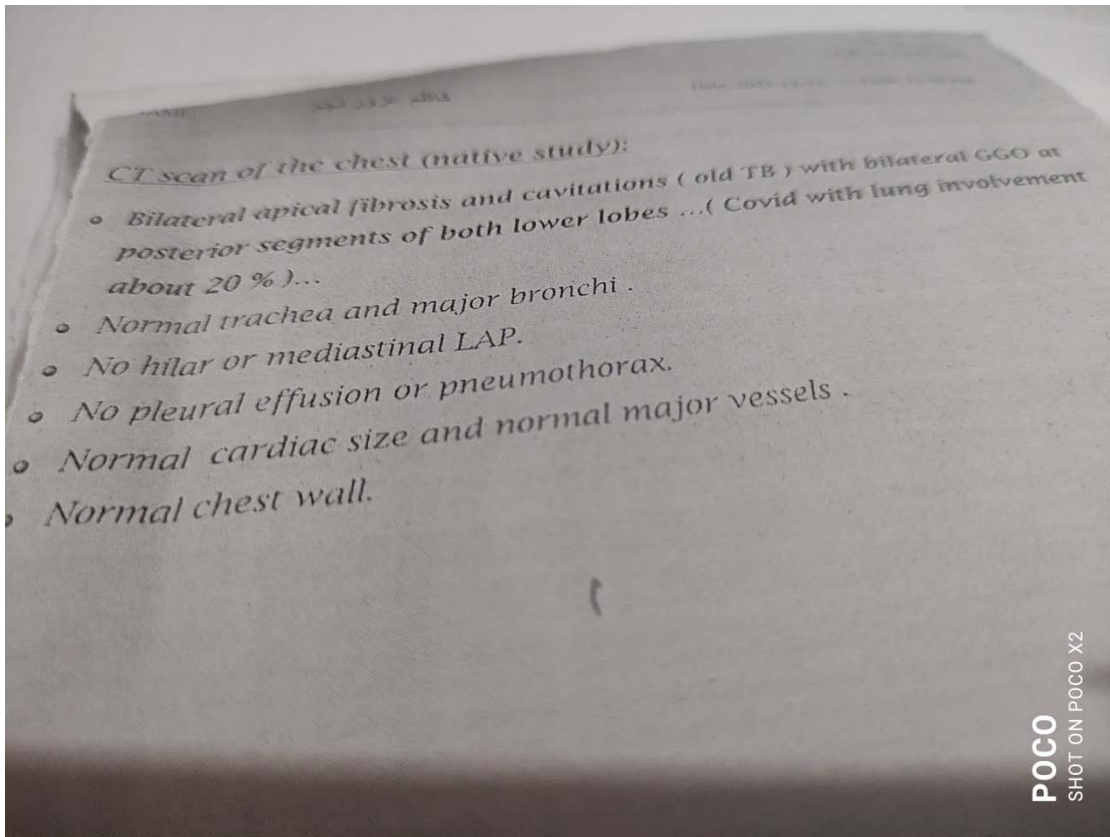
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SHOT ON POCO X2







CT SCAN OF CHEST(native) (HRCT) :
There is accentuation tree in bud appearance in both lower lobes
Minimal Ground glass appearance in both lower lobes more on left side
Picture highly suggested covid 19 to be correlate with clinical and lab. investigation
10% of lung affected
no pleural effusion

normal both hila

normal central mediastinum
normal both hemidiahragm

POCO
SHOT ON POCO X2



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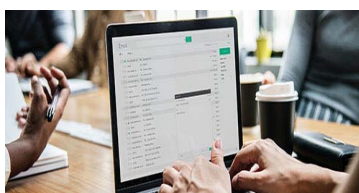
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- First character must be three lines drop-capped.
- The paragraph before spacing of 1 pt and after of 0 pt.
- Line spacing of 1 pt.
- Large images must be in one column.
- The names of first main headings (Heading 1) must be in Roman font, capital 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 through 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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Segment draft and final research paper: You have to strictly follow the template of a research paper, failing which your paper may get rejected. You are expected to write each part of the paper wholly on your own. The peer reviewers need to identify your own perspective of the concepts in your own terms. Please do not extract straight from any other source, and do not rephrase someone else's analysis. Do not allow anyone else to proofread your manuscript.

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CRITERION FOR GRADING A RESEARCH PAPER (COMPILATION)
BY GLOBAL JOURNALS

Please note that following table is only a Grading of "Paper Compilation" and not on "Performed/Stated Research" whose grading solely depends on Individual Assigned Peer Reviewer and Editorial Board Member. These can be available only on request and after decision of Paper. This report will be the property of Global Journals.

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



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