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SCHOOL OF PUBLIC HEALTH

COLLEGE OF HEALTH SCIENCES

UNIVERSITY OF GHANA

PRINCIPLES FOR THE ALLOCATION OF SCARCE HEALTHCARE RESOURCE DURING THE COVID-19 PANDEMIC: PUBLIC PREFERENCE IN COMPARISON WITH ETHICISTS' RECOMMENDATIONS IN GREATER ACCRA

BY

PETER BOIQUAYE

This dissertation is submitted to the University of Ghana, Legon in partial fulfilment of the requirement for the award Msc. in Bioethics degree

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DECLARATION

I, Peter Boiquaye, declare that, the work contained in this dissertation is entirely my own, except the works of others researchers that have been referenced or acknowledge. It has not be submitted in part or in whole for another degree in any institution

27/10/2023

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PETER BOIQUAYE DATE

(Student)

27/10/2023

…….. ……

PROF. RICHMOND ARYEETEY DATE

(Supervisor)

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DEDICATION

I dedicate this work to the Almighty God for strength to pursue this study to the end.

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ABSTRACT

Background

Allocating scare healthcare resources became significantly challenging during the COVID-19 pandemic, as decisions had to be made on a very short timeline where important evidence was incomplete or limited (Steele and Duthie, 2021). The perception of unfair allocation of scare healthcare resources was a major ethical challenge for healthcare providers during the COVID-19 pandemic. On one hand, Ethicists developed and recommended ethical principles for the allocation of scarce healthcare resources during COVID-19. On the other hand, there is the view of the public on how to allocate scarce healthcare resources during pandemics which may not overlap with that of ethicists (Lee et al, 2021). Clarifying the divergent views in health policies will enhance receptivity and success of health policies in pandemic situation like COVID-19.

Objective: To explore the preferences of the public concerning the ethical principles for allocating scarce medical resources during the Covid-19 pandemic in Ghana.

Methods

The study used a retrospective cross-sectional study design that employed an online survey. . Questionnaires were used to gather data on the socio-demographic characteristics and preferences of participants regarding the principles for allocating scarce healthcare resource for healthcare decision making in the Greater Accra Region. Convenience sampling was used to select participants for the study

Results

The study included 198 male (51.4%) and 187 female (48.6%) participants. The age of the participants ranged from18 to 69 years with a mean age of 31.4 and standard deviation of 11.4. Majority (55%) were between 18 and 29 years. The respondents prioritized 'Save the most lives'

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(mean rank of 1.99, standard deviation of 1.54) as the most preferred allocation principle. 'Reciprocity' (mean rank =6.98, standard deviation =1.33) was the least preferred ethical principle for scarce resource allocation. 'Save the most lives' which is the most prioritized allocation principle recommended by ethicists is the same principle prioritized by respondents. The respondent preferred to prioritize those that are worst off (sickest first) at the second level, but the experts propose that the benefits of scarce resources should be continuously maximized by preferring prognosis (maximizing 'life-years'). 'Reciprocity' which is highly favored by expert was least preferred by respondents .Study findings indicate that marital status (p=0.002), work status (p= 0.010), belief in the efficacy of traditional medicine (p= 0.033), honesty (p=0.001), health rating (p= 0.004) and the frequency of having medical checkup (p=0.001), had significant association with the preferences of allocation principles

Conclusion

The preference of the Ghanaian public is that scarce healthcare resources should be allocated to save the most lives. Study findings are partly at variance with the recommendation of expert ethicists. There is a gap between what experts have proposed and the public's preference. Cultural, socio-economic and health factors influence the preferences of individuals. Ethicist must seek the input of every stakeholder within the healthcare system to formulate context specific guidelines for the allocation of scarce healthcare resources.

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LIST OF ABBREVIATIONS

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AFRICA CDC	Africa Center for Disease Control and Prevention
LMICs	Low and Middle income Countries
WHO	World Health Organization

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CHAPTER ONE

INTRODUCTION

1.1 Background

Allocating healthcare Resources has been a main ethical subject for health economist and medical ethicists. Efforts have been made since the 1970s to provide fair and equitable healthcare resource allocation in consideration of increasing healthcare cost and budgets. (Marz et al, 2021). Health care resources are finite all over the world. Allocation of these resources is a challenging task. Even more challenging in low and middle income countries. Availability of health care facilities, workforce, health equipment and most importantly funds will always be limited. Therefore the demand for health care resource will always surpass supply.

Allocating health care resource is an ethical issue. Ethics which are a set of moral principles guide our behavior and choice in any given circumstance. Ethical actions are guided by written and unwritten codes of moral principles held in society. Ethics reflects beliefs about what is right or wrong, good or bad and just or unjust .Some moral norms for right conduct are common to human kind as they transcend cultures, regions and religions. This constitute what is termed as common morality such as not to kill. Other moral norms binds groups because of the culture, religion, regions and profession. Autonomy, beneficence, non-maleficence and justice are core principles which should guide ethical decision making in every sphere of life. For instance in the field or healthcare, beneficence obligates health care givers to act for the benefit of patients. Non maleficence obligates physicians or care givers not to harm patients. Autonomy considers that, all persons have intrinsic and unconditional worth. Individuals should therefore have the power to make moral choices and rational decisions concerning their health

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The task to allocate resources (funds, medicine, beds, personnel or workforce) is an ethical challenge even under non-emergency conditions. It requires that, policy makers and health service providers perform this task in a way that maximizes utility while being cost effective.

In deciding on which resource to allocate to achieve beneficence and non-maleficence, policymakers and healthcare service providers have the responsibility to ensure justice and equity. That is the right to have equal access to basic health needs and resources based on needs, so that they can have the highest level of health and wellness, Also there is the need for autonomy (the right of persons or communities to have much control as possible over their health care and treatment). The ethical dilemma is judiciously distributing resource between health systems and individuals in ways that ensures that every individual's need is catered for ethically.

Allocating scare resources become significantly more challenging during emergencies such as the COVID-19 pandemic, as decisions must be made on a very short timeline where important information or evidences maybe incomplete or limited (Steele and Duthie, 2021).Such circumstances could lead to unfair and inequitable allocation of resources which goes against the principles of ethics. This could further complicate an already challenged health system.

The COVID-19 pandemic raised several ethical challenges globally, some of which were existing prior to Covid-19. This include the unfair allocation of scare healthcare resources.(Moodley et al, 2021). Due to its life threatening nature, it demanded full attention of every country and the world at large. During COVID-19, health departments in countries had to create provisions and plan ways to limit the spread and manage the situation (Srinivas et al, 2020). Public health care systems were placed under enormous pressure. Health care resources that were already stretched were subjected to constant strain (Yip, 2021). Also the need for medical resources, including staff, supplies, medical equipment, and space quickly outstripped available supply (Hempel et al, 2021).

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COVID-19 raised a lot of ethical questions, from the care of patients in healthcare facilities to the health of a whole population. Decisions had to be made concerning who should have access to limited treatment, for example, access to ventilators, vaccines and priority access to personal protective equipment. Also health workers within the healthcare fraternity struggled with ethical conflict inherent in choosing between their lives, that of their families, and those of their patients. (Moodley et al, 2021). To ensure that a system for the optimal allocation of scarce resources is established, planning is needed in advance. (Yip, 2021).

According to Cordeiro-Rodrigues & Ewuoso, 2022, fair plan and sensibly developed or applied principles and guidelines are essential in the justification of the denial of beneficial care to persons on the grounds of scarcity and building a health system that is equitable. Ensuring justice in the delivery of healthcare during emergencies is very important. In light of this, Different guidelines and principles have been developed by ethicist and the World Health Organization to aid policy makers and healthcare service providers make informed decisions with regard to allocating scarce medical resources during pandemics. Principles such as equality, best outcomes, prioritize those tasked with helping others and prioritize the worst off are mostly used to allocate medical resources during pandemics. Different medical resources target different groups within the population as such different principles of allocation may be applied to these resources.

A World Bank Data report in 2019 revealed that Ghana has a 0.2 physician and 42 nurse/midwives per 1,000 and 10,000 people respectively in Ghana. Another study by Siaw-Frimpong et. al (2021) showed that Ghana has a total of 67 intensive care beds for a population of 30 million. These suggest that, the health system in Ghana has been in a state of health worker shortage, even in non-pandemic periods, the pandemic amplified the scarcity of these medical resources. (Laar et. al,

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2020). Ghana couldn't escape rationing during Covid-19 and cannot do so if any future emergency should hit the healthcare system.

COVID-19 is life threatening, and the provision and accessibility of medical services must not be influenced by wealth, gender and caste as all lives are equal. Healthcare resource was withheld for the aged at a certain point during the covid-19 pandemic, and there was a serious public criticism against this (Rosenbaum, 2020). Resource allocation principles and guidelines must be geared towards protecting those that are most vulnerable. As such, the input of every stakeholder, from healthcare service provider to high risk population and the general public should be considered in-depth in developing a standard set of guidelines. According to Srinivas et al, 2020, guidelines may not be universally applicable as situations from nation to nation varies therefore every country has to be encouraged to develop its guidelines and regulations.

1.2 Problem Statement

There is limited or no professional and democratic engagement on the subject of allocating resources during emergencies in Africa and particularly Ghana. This is an unacceptable ethical exclusion (Laar et al, 2020). Also an assessment of the ethics-sensitivity of Ghana's plan showed that several ethical issues such as no public consultations in decision making processes had been unforeseen, unavow and unaddressed and lack guidelines on allocation of scarce resources. (Laar et al 2020). However ethicist have formulated and provided guidelines on how scarce health care resources can be allocated during pandemics like COVID-19, and these guidelines (example, "Complete Lives System" by Emmanuel et al.(2020))can be adopted and used in Ghana during emergencies. But according to Lee et al (2021), the general public's view on how to allocate limited healthcare materials during pandemics appears to disagree with the view of Bioethicists.

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A study in the United States, showed that, the view of the general public on the fair allocation of scarce medical resources was inconsistent with the view of ethicists (Fallucchi et al, 2021). This, therefore, suggest that most ethical guidelines on rationing do not reflect the views of the public. It is necessary and needful to additionally probe the preferences of the Ghanaian public regarding the allocation principles for scares resource during emergencies like COVID-19. Significant disparity in preference may be held by lay public and bioethicist. The special significance given to the consistency of arguments as a basis for moral judement should not be determined solely by ethicians, because it is not an adequate measure for justice. (Schicktanz et. al 2020). The views and preferences of individuals (the public) who are most affected must be considered when guidelines on allocating scarce health resources are developed and executed.

1.3 Study Goals and objectives

This study explored the preference of adult Ghanaians regarding the Ethical Principles for Allocating Scarce healthcare resources during Covid-19 pandemic in Greater Accra with the following research questions and specific objectives.

Research Question

1. What are the preferences of the Ghanaian Public for the principles for allocating scarce healthcare Resources in Accra?
2. What influences the preferences of individuals for the allocation principles of scarce healthcare Resources

General objective

1. To investigate the preferences of the public concerning the ethical principles for allocating scarce healthcare resources during the Covid-19 pandemic in Ghana

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Specific Objectives

1. To identify and rank the preference of the general public for scarce healthcare resource allocation principles.
2. To determine the factors which influence the preferences of individuals for the principles of allocating scarce resources

1.4 Justification of the Study

It is critical to reflect the public's values in policies. There is also the need to incorporate the views of the public because resource allocations policies entail determination of who shall survive or not. When people perceive the guidelines as unjust, the receptivity would be very low. No empirical study has yet investigated the preference of the Ghanaian public concerning allocation of scarce healthcare resources which are scarce. This study will provide empirical evidence of the preferences of Ghanaian public on scarce healthcare resource allocation principles. These views and preferences will be useful in the formulation of scarce healthcare resource allocation policies or frameworks. The study will contribute significantly to international literature related to principles of scarce resource allocation.

No one can predict when the next pandemic will strike. However it important to plan ahead so that healthcare professionals are not caught off guard when faced with the dilemma of allocating scarce healthcare resources. There must some level of compatibility between the views of expert ethicist and that of the general public. Knowing and incorporating the views of the Ghanaian public into already existing guidelines on how to allocate scarce healthcare resources or new guidelines will prevent resistance and boost the receptivity of the Ghanaian public. It will further help ethicist to provide robust guidelines and principles for allocating scarce healthcare resources

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1.5 Conceptual Framework.

Conceptual framework for this research is based on literature reviews on factors which influence the preferences of individuals and factors which directly affects healthcare resource allocation. Factors which include health, culture, Socio-economic conditions and individual factors affects the state of preference of individuals. Political factors directly affects resource allocation.

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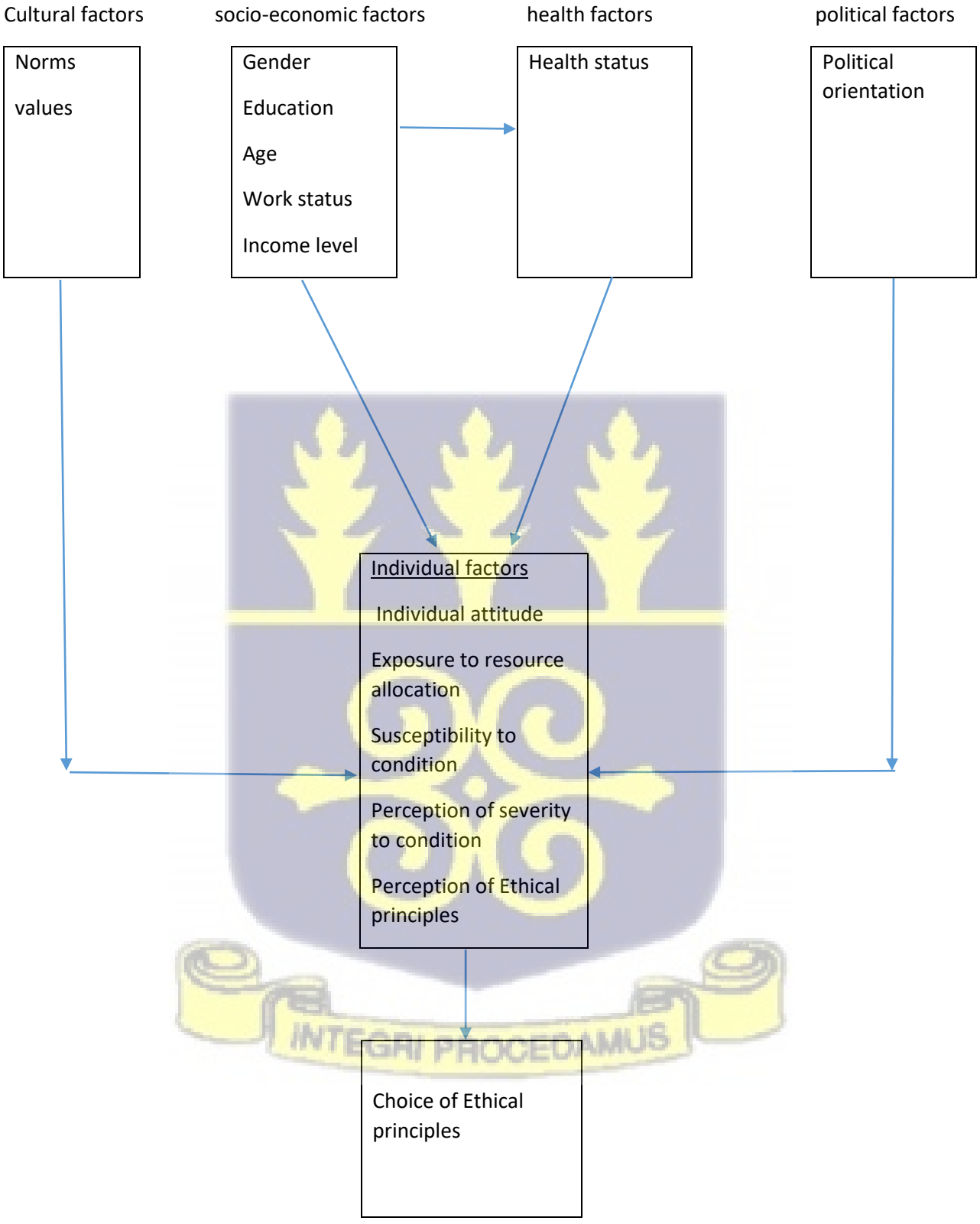
Figure 1. Conceptual framework for the preference and Factors which influences an individual's preference for ethical allocation principles



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This framework attempts to explore the aspects of individuals which influence their preference for an allocation principle or method. The framework indicates that the choice of an allocation principle for scarce healthcare resource is a function of cultural, socio-economic, health, individual and political factors. Socio-economic factors (gender, education and employment, level of income) affect our ability to make healthy choices and how susceptible an individual might to the condition. These factors have direct influence on health and individual factors. Culture plays a significant role in our orientation as moral agents. As indicated in the framework culture determines how we view ourselves and others, and also affect our values to care for and empathize with others. It has a direct effect on an individual which affects the individual's choice of allocation principle. An individual's health status might have an effect on his or her attitudes toward health policies or programs. The influence of these parameters on an individual might affect his or her preference for the principles of allocating scarce healthcare resources. It can be deduced from the framework that Individual factors (susceptibility to the disease, experience or exposure to any form of resource allocation, perception of the severity of disease and perception of the ethical principles) directly influence the choice of ethical principle. Political factors such as an individual's political orientation such being a socialist or a capitalist has an effect on the preference of scarce resource allocation principle

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CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter provides review of literature related to the subject matter and objectives of this study. The review of the study is guided by the research objectives and conceptual framework. The review covers areas such history of COVID-19, impact of age and co-morbidities on COVID-19 severity, gender and COVID-19. This chapter looks also at frameworks to examine public health programs and practice and the ethical allocation of scarce health resources.

2.1 Theoretical framework

Gert's theory of Common Morality

According to Bernard Gert (2004 p. 3-17), common morality is a moral system that people use implicitly when making decisions and judgments. People in this regard stand for entire humanity. Except individuals who by virtue of their age or serious disabling conditions, cannot be considered moral agents even though they continue to remain moral persons. According to Paranhos, Garrafa and Solbakk (2019), this theory holds that all moral agents agree there are actions that are morally good such as to save lives, prevent pain, cure or prevent disability unless one violates a moral rule by doing them. Gert claims that all rational agents make judgments about a particular course of action through their rationally required beliefs. According to Samuel Scheffler, it is a conviction shared in one's culture and so deeply entrenched.

It can be alluded from Gert's theory that the individuals will implore common morality when asked to make judgment on how scarce healthcare resources should be allocated during emergencies. As moral agents, when tasked to choose between different principles on how to allocate scarce resources, one is likely to prefer principles that will inure to the greater good of society.

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2.2 History of COVID-19

Coronaviruses (CoVs) are a family of positive single-stranded RNA ($_{+}$ssRNA) viruses that belong to family *Coronaviridae* (Woo et al, 2010). Out of seven human coronaviruses (HCoVs), three cause severe respiratory diseases of high fatality rates. The first is Severe Acute Respiratory Syndrome-CoV (SARS-CoV) that emerged in 2002 and followed by Middle East Respiratory Syndrome-CoV (MERS-CoV) in 2012 (Lim et al, 2016). SARS-CoV-2 was identified as the third HCoV in December 2019 that causes acute respiratory distress syndrome (ARD) with viral pneumonia (Zhu et al, 2019). It was later named Covid-19. The first cases of SARS-CoV-2 infections originated in the city of Wuhan, China and soon the disease spread to 177 countries causing a global outbreak. As of July 14, 2020, 12,929,306 cases of COVID-19 were confirmed including 569,738 deaths gobally, and as of September 7, 2022, 603,711,760 cases of Covid-19 was confirmed, including 6,484,136 deaths (WHO, 2022). On March 12, 2020, Ghana recorded its first two cases of COVID-19 infection. Data from the Ghana Health service(2022), indicated that a total of 168,616 case were confirmed, including 1,459 deaths.Covid-19 virus is transmitted between people through respiratory and contact routes (WHO, 2020)

2.3 Impact of Age and Medical Co-morbidities on COVID-19 severity

Everyone was at risk of contracting the covid-19 disease and age often plays significant role in determining the severity of the illness in patients. Cascella et al stated that, patient age≥60 and those with underlying medical conditions (cardiovascular diseases, diabetes, cancer, and chronic lung disease) had a high risk of contracting Covid infection. Patients with pre-existing medical conditions had higher percentage (45.4% vs. 7.6%) of being hospitalize than those without. They further went on to state that patients with pre-existing medical conditions surrendered to the illness 12 times higher than those without conditions. This suggest that older adults might need

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hospitalization, intensive care and ventilators to help them survive. It was therefore important to consider carefully this parameters during the allocating scarce healthcare resource during COVID-19. These parameters will help answer the ethical question of who should be treated first and who gets access to vital health services and resources such as ventilators and beds to ensure fairness and equity

2.4 Gender and Covid-19

Covid-19 seem to have impacted men and women differently. According to a study conducted by Gebhard et al, 2020, differences existed between genders in relation to covid-19. The study stated that male patients were likely to develop severe illness and increased mortality as a result of covid-19 compared to female patients. A retrospective cohort study which determined the rate of death in 209 US acute care hospitals was conducted by Finelli et al, from March 1 to November 21, 2020. This study involved 42,604 patients with confirmed SARS-CoV-2 infection. Result from the study showed that compared to female patients, death was higher in males (12.5%) than in females (9.6%).

2.5 Frameworks to examine public health programs and practice.

Kass. (2001), employed an analysis called principlism, and gave a method to determine the burdens and benefits of a public health program (Laar, 2014). He looked at principles which are in agreement with the principles by Beauchamp and Childress (Beauchamp & Childress, 1994). These principles are beneficence, justice and autonomy. kass' framework draws attention to the ethical issues of recommended public health programs, suggesting ways of solving them (Laar, 2014). Categories of three ethical issues are determined by the framework, which are the risk to justice, risk to self-determination and liberty and risk to privacy and confidentiality. This

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framework looks at enhancing health of the public as moral issues connected to beneficence. To appraise the ethics of a recommended public health program, relevant questions to ask are":

1. What are the public health goals of the proposed program?
2. How effective is the program in achieving its stated goals?
3. What are the known or potential burdens of the program?
4. Can burdens be minimized? Or are there alternative approaches?
5. Can the program be implemented fairly?
6. How can the benefits and burdens of a program be fairly balanced

An analytic framework by Beum et al. (2007), was fashioned to assist policymakers and practitioners in controlling the ethical tensions they face in public health (Laar, 2014). There ought to be a balance of different ethical considerations by Practitioners within public health. Practitioners must not follow one organizing moral principle. Beum et al. (2007), advanced an ordered guide based on six considerations to help decision-makers recognize budding ethical problems in public health practice. The guide can also lower the inception of ethical tensions. According to Laar, these considerations are " determine Population-level Utility of the proposed Action, demonstrate evidence of need and effectiveness of Actions, establish fairness of Goals and proposed implementation of strategies, demonstrate Accountability, assess expected efficiencies and costs associated with the proposed action and consider political feasibility and community acceptance."

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2.6 Ethical Allocation of Scarce Resources

Allocating healthcare Resources occurs at a macro and micro level. Macroallocation entail apportioning healthcare at a societal level. It determines how resources and funds will be distributed within the area of health. At the Microalloction level, emphasis is placed on the decisions regarding treatment of specific person and it is the focus of this study. When the need of healthcare resource exceeds available supply, it becomes necessary for resources to be apportioned on some criteria or policy hence the need for allocation guidelines or frameworks. Rationing is a more precise terminology in such circumstances. According to sheunemann & White, (2011) rationing becomes necessary during emergencies such as the covid-19 pandemic as there is a need for a fair and equitable allocation of scarce resources like medication and vaccines.

To understand the ethics behind resource allocation principles, two main philosophical theories have been used, Utilitarianism and Egalitarianism. According to Savulescu *et al* (2020) Utilitarianism is a prominent moral theory or principle which asserts that the right action is the action that is required to produce the greatest good. Right actions must bring maximum happiness. It also offers principles that are clear on how scarce healthcare resource can be allocated during emergencies. Act utilitarianism holds that, the determination of the morality of an act is based on its benefits to the people, if a right act produces a result that is useful to most people, it is seen as morally right. Primarily it brings greater happiness or good to the majority of people. The right action produces greater good and benefit to people and as such can be considered morally right. Rule Utilitarianism asserts that an act is morally right if it adheres to the rules that brings about greater benefits. Greater happiness can be achieved by adhering to the right rules that apply to everyone equally. It believes that following specific rule developed from a moral code of principles should result in increasing the overall utility of the majority of people.

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The end goal of utilitarianism is to maximize utility. Whenever a Utilitarian solution to a dilemma like the allocation of scare resource during COVID-19 is applied, there will be more happiness in our societies and the world. (Savulescu et. al, 2020). An article by Yip *et al*(2022) states that rationing based on utilitarianism will be focused on the execution of actions that has the most benefits and with the least negative effects. Patients who are considered to have better response to treatment were likely to be prioritized and patients who were found to have short term benefits were likely to be excluded.

Unlike utilitarianism, Egalitarianism pays attention to the act and not the result the act produces. According to this principle, on the basis of social worth, every individual is equal. (Grover et. al, 2020) Egalitarianism advocates for providing individuals with equal chance to have basic goods in life stressing on equal moral status. A lottery to determine who receives a scarce medical resource is a typical example of egalitarianism.

Laar et. al (2020) proposed five moral consideration applicable to rationing and their importance during the COVID-19 pandemic in an African context. According to Laar and colleagues, rationing can be done grounded on "Utilitarian Principle, equity principle, equal worth principle, urgent need principle, and priority principle". The Utilitarian principle according to them demands that, in terms of allocating limited COVID-19 goods and service, patients who will respond better to treatments should be prioritized. Greater burden of diseases are suffered by socially disadvantaged than those who are more privileged as such when the application of this principle is not carefully examined it could further compound prevailing systematic disadvantage. This utilitarian principle may be called on to direct scarce resource allocation that present substantially different benefit to different individuals (Laar et al. 2020). The equity principle entails the allocation of resources, such that outcome whether positively or negatively are shared fairly (Laar et. al 2020). It seeks to

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lower inequalities in conditions of health of diverse class of individual within the society. Prioritizing individuals who are highly exposed to infection and disease is basically the aim of this principle (Laar et. al 2020). The idea of equal access is not a recommendation under Equity principle. For example when health workers are prioritized for access to PPE, they will be protected , preventing them from getting infected and this will largely prevent or reduce infection that might come from them to the general population and ultimately saving the lives of many. The urgent need principle requires that people who might die soonest, or will be worst off from not receiving health resources or when resources are delayed must be prioritized. For instance it will be right to allocate vaccines to frontline health care workers to protect them from getting infected. People are of equal worth and the value of each person's life should be seen independently of their economic status and social position. This, indeed, is the idea behind the principle of equal worth. We are equal regardless of what we do or the positions we hold. The equal worth principle reject prioritizing elite and the privileged in society when rationing scarce resources. According to Brock (2002), Prioritarian principle demand that health care resources are allocated to members of the society who are disadvantaged. This class of individuals include those that are poorest, youngest, elderly and homeless in the context of COVID-19 (Laar et al, 2020).

Persad et al. (2009) presented and classified two principles for allocation of scarce resources: instrumental value, which is; prioritizing individuals with distinct skills and purpose such as front-line health workers. And Reciprocity; prioritizing individuals or people such as blood donors who have been useful to society before emergency period. However many of the principles according to them can ethically justified even though they are not sufficient (Grover et al. 2020).

During the pandemic a framework for allocating COVID vaccines was provided by Africa CDC. The framework is founded on native values held in Africa. It evaluates structure of societies in

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Africa, and what a fair and equitable allotment of vaccines based on native African value would mean. The Africa CDC asserts that an individual's identity is mutually related to the identity of the community in the African society and hence none is supreme. They employed "Ubuntu which represents the culture and philosophy of the ideals of the African society".

According to this philosophy, "to deny another person's humanity is to depreciate one's own humanity" because of the co-existing relationship that exist between members of a community. It is impossible to separate the wellbeing of the community and that of individuals as they are complexly interlaced. When distributing resource, emphasis must be placed on solidarity and equitable distribution. The indigenous African value system is exclusionary on the basis of gender hence the framework created by Africa CDC is a hybrid between modern principles of ethics and indigenous African traditions. This promotes human right and worth and includes all members of the community. For instance the helpless, needy and underprivileged in rural and urban slum should have equal access to scarce medical resources. All persons should have access to vaccine irrespective of their gender, religion and sexual orientation (Africa CDC, 2021). Scarce resource allocation decision should be based on factors such maximizing benefits produced by scarce resources, equal treatment to people, priority to most vulnerable, promoting instrumental value, and allocation independent of socioeconomic status.

The Africa CDC framework highlights the need for allocations to be socially and communally negotiated through discussion, public dialogues and respectful conversation with stakeholders and community members. Because, apart from ethicist, psychologist, philosophers, and policymakers, the general public have an interest in the allocation of scarce medical resources. (Persad, 2017). This is will give community members a sense of ownership in decision making and participate fully to ensure the success of public health programs or interventions.

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Table 1.Allocation framework guided by African indigenous values

	Values	Application
A	Affirming the humanity of others	Allocation choices must be to the advantage of society and advance common wellness whiles regarding human respect. Each individual has equal right, worth, and esteem, consequently allotment choices must be non-discriminatory.
B	Community survival	Allocation decisions should be based on the best available evidence. Essential service workers and those who contribute to the prevention and treatment of diseases could be considered as essential for the survival of the community. Those at greatest risk of severe illness and death could be included in the priority groups.
C	Social solidarity	Allocation choices ought to consider the bonds binding communities together, their interdependency, connection to and interest in others and the important social, financial and individual disturbances and hardships experienced
D	community engagement	Trusting allocation choices made about how things are divided or used. When people in a community actively participate, it makes decisions more honest and promotes accountability. This makes people more likely to trust the decisions made about how things are given out. We need to involve the community to help convince people to get vaccinated, make sure people trust our efforts to control the pandemic.

Adopted from Africa CDC, 2021: Framework for Fair, Equitable and Timely Allocation of COVID-19 Vaccines in Africa

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In the heat of the Covid-19 pandemic, Emmanuel et al.(2020) identified 8 ethical values to guide the allocation of scarce care resource during COVID-19 pandemic. These values are presented in the table below.

Table 2. Principles for the ethical allocation of scarce health care resources during Covid-19 pandemic

Ethical Values and Guiding Principles	Application to COVID-19 Pandemic
Maximize benefits	
Save the most lives	Receives the highest priority
Save the most lives- maximize prognosis	Receives the highest priority
Treat people equally	
First-come, first-served	Should not be used
Random selection	Used for selecting among patients with similar prognosis
Promote and reward instrumental value (benefit to others)	
Retrospective — priority to those who have made relevant contributions	Gives priority to research participants and health care workers when other factors such as maximizing benefits are equal
Prospective —attention to those who are likely to form important contributions	priority to health care workers
Give priority to the worst off	
Sickest first	Utilized when it maximizes benefits
Youngest first	Utilized when it maximizes benefits such as avoiding spread of the infection

Adopted from (Emanuel *et al*., 2020, *N. Engl. J. Med*., *382*, 2049)

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According to Emmanuel *et al.* (2020), the principle of getting as much good as possible is most important and the principle of "save the most lives" supersedes the rule of "save the most life-years." Next, the principle of "priority to individual likely to make crucial contribution" (like doctors, frontline health workers) can be used. Again, they suggested that among people with the same prognosis, the principle of "random selection" should be used in considering equality, not the principle of "first-come, first served", which are centered on individuals and represent an equality for all approach. (Grover et. al 2020) The principles of "sickest first" and Youngest first" which represent the principle of Prioritarianism ought to be utilized when they tend to maximize utility. Based on these ethical principles, they suggested six recommendations on how to allocate health resource during the COVID-19 pandemic. The recommendations are:

1. The value of maximizing benefit is most important in the context of a pandemic
2. "Critical Covid-19 measures— testing, PPE, ICU beds, ventilators, therapeutics, and vaccines —ought go first to front-line health care workers and others who care for ill patients and who keep critical infrastructure operating, particularly workers who face a high risk of infection and whose training makes them difficult to replace."
3. For patients with comparable prognosis, balance ought to be used and operationalized through random allotment, such as a lottery, instead of a first-come, first-served allotment prepare.
4. Prioritization rules ought to contrast by intervention and ought to react to changing scientific evidence
5. People who take part in research to demonstrate the safety and viability of vaccines and therapeutics ought to be prioritized Covid-19 interventions

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6. There ought to be no distinction in distributing rare assets between patients with Covid-19 and those with other medical conditions.

WHO in 2020 provided basis to decide priority access to limited resources. The moral grounds deciding who should be prioritized and the principles that should be applied are presented in the Table below

Table 3. Moral considerations when choosing who to prioritize

Principle	Description	Implication in practice
Equality	Everyone's interest count the same except when there are justifiable reasons that permit resources to be prioritize Race, gender, ethnicity and other characteristics must not serve as a ground for allocating resources. The principle could be the basis on which allocation methods such as lottery or first-come, first-serve can be employed	It can rightly be used to steer the distribution of limited resource among people who are expected to derive similar benefits from resources.
Best Outcome (utility)	It can be used to justify Allocation system that is likely to maximize benefit and lower harm minimally Eg. Saving the most lives.	Suitable to direct the allotment of rare resources that bestow considerably distinctive benefits to diverse people, r eg.ventilators to those anticipated to benefit most
Prioritize the worst off	It can be used as basis to share resources to individuals in need of urgent health care	Suitable to direct the allotment of resources that are planned or expected to secure those at risk, eg PPE

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		healthcare workers, vaccines for those at most risk of infections or those who need it the most
Prioritize those tasked with helping others	It can be utilized to legitimize the allotment of resources to those who have certain skills or abilities that can save the lives of numerous other individuals, or since something is owed to them on basis of them helping others	It can be used to direct resource allocation to healthcare givers, those working to produce vaccines etc
Adopted from WHO (2020),		

A study by Lee *et al.* (2021), sought to determine the preference of the public in korea concerning limited health resources during COVID-19 pandemic and compared it with the suggestions made by ethicists. Korean public agreed strongly with the principles of "save the most lives," "Korean first" and "worst off". They however disagreed with the principle of "random selection". Ethicists and the public both gave highest priority to "save the most live" principle. A greater probability of accepting utilitarianism allocation principles was linked with a higher perceived severity of the pandemic. Utilitarianism principles for sharing limited resource was high, identity and prioritarianism were the preferences of the general Korean public. Egalitarianism was least preferred.

When the populace agree with the policies and frameworks set out to allocate resources during normal times and in particularly during emergencies, the execution of these principles tends to run smoothly without resistance from the people who are meant to benefit from these ethical frameworks. During COVID-19, a study by Pihno, (2021) also sought to investigate the view of

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the public concerning standards that should be used to allocate medical devices to critical COVID-19 patients during the pandemic. It explored how the general public in Portugal assessed the fairness of five principles of allocation: “prognosis”, “severity of health condition”, “patient age of patients”, “instrumental value” and “lottery”. Among the Principles, Respondents saw “prognosis” as the principle that should be highly prioritized, followed by “severity of health conditions”, patient’s age and instrumental value had the lowest consideration. Respondents favored the principle of youngest-first over recovery when age of patients was confronted with survival. Although the opinions of respondents agreed with the opinion of ethicists, they disagreed with the protocol recommended for Portugal during the pandemic

COVID-19 crisis generated a lot of discussion concerning ethics in medicine and making ethical (Pauls et al, 2020). Globally, there was a struggle by health systems to meet healthcare demands. In the case of Ghana, Treatment and holding centers had to be constructed within that period. Also medical professional had to take life and death decisions. Without Guidelines, decision making are left to the discretion of healthcare givers and this will be unethical. Majority of research has been directed at providing frameworks for allocation basing solely on the views of ethicist and healthcare practitioners, relegating the views of the public to the background and this is unethical.

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CHAPTER THREE

METHODS

3.0 Introduction

This chapter outlines the design and method of the research to investigate the public preferences regarding the allocation principles for scarce medical resources in the Covid-19 pandemic in Greater Accra. The methodology was guide by study objectives. It entails Study design, method for sampling participants, techniques for collecting data and ethical considerations.

3.1 Study Design

This is a quantitative cross sectional quantitative study. An online survey was conducted. Study subjects comprised of adults age 19 years to 69 years residing in Greater Accra and who are not healthcare workers or professionals. This Study is a retrospective study. It collected and analyzed data on what the general public believe is the ideal way to allot scarce healthcare resources during the Covid-19 pandemic. The entire study (recruitment, data collection and analysis) lasted for period of one month. The Study employed quantitative data collection approach and lasted for four weeks. Questionnaire was used to gather data. The questionnaire was developed from the allocation principles and the factors that influences an individual's preference for these principles

3.2 Study location

The Greater Accra Region is one of the regions in Ghana and within this region is the capital city of Ghana. The population of Greater Accra stood at 5,455,692 (Ghana statistical service, 2021). It has 707 National Community Health Planning service facilities, 299 clinics, 101 maternity homes, 32 health centers and 22 polyclinics. It has one Regional Hospital, Two Teaching Hospitals (Korle-bu Teaching hospital and 37 Military Teaching hospital) and one University

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Hospital, which are located in the Korley Klottey Municipal, Accra Metro, La Dade Kotopon Municipal and Ayawaso West Municipal respectively (Ghana Health Service, 2022). The region recorded Ghana's first covid-19 case and a total of 95,769 cases (Ghana health service, 2022). Two major treatment centers and 6 other treatment and holding centers were located in the Greater Accra Region.

3.3 Study Population

The population for the study were Ghanaian Adults living in Greater Accra, age 19-69 years.

3.4 Sample size determination

To estimate the number of respondents required for the study, the following assumptions were made.

Confidence level =95%, therefore z score =1.96

Standard deviation = 0.5

Margin of error (confidence interval) = +/- 5%.

Using the formula,

$n = z^2 \times d \times (1 - d) / e^2$

Sample size = 384

3.4.1 Inclusion criteria

Ghanaian men and women age 19 to 69

Ghanaians living within the Greater Accra Region

3.4.2 Exclusion criteria

Ghanaians who are health care workers or Ethicists

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3.5 Sampling method

Random sampling approach was used to choose participants for the study. An online survey was administered using KoboToolbox; an integrated set of tools for building survey forms and collecting interview responses. Invitation letters were sent and distributed on social media platforms and groups (Twitter, Whatsapp and Facebook). Individuals who accepted the invitation to participate in the survey were sent the survey link to complete the questionnaire. Only responses from persons who met the age criteria of 19 to 69 years and lived in the Greater Accra Region were considered. Healthcare professionals and Ethicists did not qualify for this study

3.6 Data collection technique and Tool

Questionnaire was used to collect data for this study and it was administered using KoboToolBox, after respondents have consented to participate in the survey. The questionnaire was developed from the conceptual framework. It captured cultural (e.g. values), socio-economic (e.g. age and sex), health (e.g. health status) and individual factors (e.g. exposure to resource allocation). Socio-demographics characteristic of the participants were collected, three socio-demographic questions were presented in a 5-point likert scale of which participants must choose their level of agreement or disagreement. Participants also completed a questionnaire asking them to rank-order eight different ethical positions with respect to the allocation principles of scarce health care resource.

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3.7 Study Variable

Dependent variable:

The choice or preference of allocation principle in this study is the outcome variable.

Independent variables:

Variables such as Age, gender, marital status, work status, exposure to resource allocation, health status, rating of honesty and optimism are independent variables. Age and gender can be described as categorical variables in this study. Education, work status and health status which are ordinal variables have influence on the choice of allocation principle of respondents. Honesty and optimism which can be ranked in terms of degree are ordinal variables and can influence the choice of allocation principle.

3.8 Pre-test and Quality control

Pretesting of study instrument was carried out online on social media platform (whatsapp). 30 respondents were sent the survey link to respond to the pilot questionnaire. The questionnaire included evaluative questions such as respondent perceptions of the length and difficulty of questionnaire. This also determined the response rate of the questionnaire

3.8.1 Training of research assistants

Collection of data was assisted by 2 research assistants. They were recruited and trained in order that responses obtained from participants were valid and reliable. They were trained in the areas of study information, sample selection and ethics of research. They assisted with data management using the koboToolBox software. They also assisted with the cleaning of data from the survey such as deleting responses from respondent who are not within the study location.

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3.9 Data analysis

The statistical analysis of data was conducted using Statistical Package for Social Sciences (SPSS) 22.0

Data of participants who wrongly chose a single principles to occupy different positions were removed. Data was edited, clean and formatted to ensure completeness. Categorical variables were presented using Means and standard deviations. Continuous variables were summarized using means and standard deviations. 5 set of questions to determine individuals characteristics based on moral values, health status and attitude towards health were asked using a Likert scale. Responses were weighed and scored accordingly, not at all was scored 1, only a little scored 2, to some extent scored 3, rather much scored 4, and very much scored 5. Another set of 4 questions based on same parameters were asked and responses also scored accordingly, No score 0 and Yes scored 1. Participants also rated their health status on a scale of 1 to 100.

The eight ethical principles from the complete data of participants were ranked based on their means. Kendall's coefficient of concordance was computed to obtain a measure of the degree to which participants agreed to the relative importance of the principles. To investigate which aspect of participants (eg. gender, educational level and religion) influenced their most preferred solution to medical resource allocation a multinomial logistic regression was computed to determine this. The same test was also run to investigate the difference among individuals which lead individuals to prefer an allocation system that is not the most common preferred allocation system all statistical test in the study were at a 0.05 level of significance.

3.10 Ethical Consideration

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The study protocol was submitted to the 37 Military Hospital (37MH) Institutional Review Board (IRB) for ethical review. Ethical approval was granted after meeting all requirements. 37MH-IRB/MP/IPN/675/2023.

Informed consent

Consent form contain all significant information on the purpose and relevance of the study. Based on this given information participants had the opportunity to decide whether to take part in the study or not.

Confidentiality

Participants' identity and personal information were held in secret and not release outside of the study team. This confidentiality is extended to cover any study information relating to participants. Data collected will be stored on a hard drive and locked in cabinet. Any personally identifying information collected will be kept confidential and separated with coding from the data.

Benefits

There were no direct benefits to study respondents.

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CHAPTER FOUR

RESULTS

4.0 Introduction

Chapter four presents the study findings. It also provide answers to the study objectives. A summary of the characteristics of respondents of the study is shown in this section. It also presents the preferences of the general public in Greater Accra, regarding the principles of allocating scarce healthcare resource. Collection and analysis of data was from February 2023 to March 2023.

4.1 Characteristics of respondents in Greater Accra

Three hundred and eighty-five participants took part in the study, 198 male (51.4%) and 187 female (48.6%). The participants' age ranged from18 to 69 years. Majority (55%) of them between 18 and 29 years, Mean age of 31.4 and Standard Deviation of 11.4. In all, 70% had completed first degree program at the bachelor's or postgraduate level. Almost two-thirds (59%) were single and 38 % married. Respondents rated themselves on honesty and averaged 3.58 (*standard deviation* =.62), on a scale of zero to five. On the same scale, the frequency of having a medical checkup averaged 2.23 (*standard deviation* = 1.1) out of 5. On a scale of 1(very poor) to 100(very good) average health rating was 76.6 (*standard deviation* = 28.3)

Furthermore, majority (86%) of respondents indicated that they believe in life after death; majority (75.8%) also believe Ghanaian health facilities are under resourced

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Table 4: socio-demographic characteristics of respondents

Characteristics	Frequency (N=385)	Percentage
Sex		
Male	198	51.4
Female	187	48.6
Age		
18-29	212	55.1
30-39	97	25.2
40-49	40	10.4
50-59	14	3.6
60-69	22	5.7
Marital status		
Single	227	59.0
Married	146	37.9
Divorced	6	1.6
Widowed	6	1.6
Education level		
Junior high	10	2.6
Senior high	104	27
Tertiary	218	56.6
Postgraduate	53	13.8
Work Status		
Unemployed	130	33.8
Employed	255	66.2
Believed in Life after death		
Yes	338	86
believed our health facilities are well resourced		
Yes	93	75.8

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4.2 Preferences of Respondents for scarce health resource allocation principles

Three hundred and eighty-five participants provided complete rank data for the eight principles of scarce healthcare resource allocation. Mean rank positions of the general public's preference for the scarce healthcare resource allocation principles is presented in Table 5. The general public chose "Save the most lives"(*mean =1.99 , standard deviation=1.54*) and as the most preferred allocation principle. "Sickest first" *(mean=2.99, standard deviatrion of =1.46*) was the second most preferred principles followed by "First come, first-serve" *(Mean=2.99, standard deviation=2.17*). "Lottery" (*mean=6.78, standard deviation=2.00*) and "Reciprocity" (*mean=6.98 standard deviation=1.33*) were rated low and were the least preferred allocation principles by the public. Table 6 shows the agreement and disagreement in preferences between the study respondents and expert ethicists for the principles for allocating scarce healthcare resources. Kendall's coefficient of concordance was found to be significant, *kendall's W*=0.52, χ 2 (7) = *1397.77*, $p < .001$. Participants showed a significant level of agreement concerning the relative importance of the allocation principles

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Table 5. The mean ranks positions of the ethical principles chosen by respondents from the study

Scarce resource allocation Principles	*M(SD)*	95% Confidence interval
Save the most Lives	1.99 (1.54)	1.83-2.14
Sickest first	2.99 (1.46)	2.85-3.14
First-come, first-served	3.68 (2.17)	3.46-3.89
Youngest first	3.66 (1.33)	3.73-3.99
Prognosis	4.32 (1.47)	4.18-4.47
Instrumental value	5.40 (1.13)	5.29-5.52
Lottery	6.78 (2.00)	6.58-6.98
Reciprocity	6.98(1.33)	6.85-7.11

M=Mean ,
SD=Standard deviation.

Table 6. The first to eight choice of respondents for the principles of scarce resource allocation compared to Experts recommendation

Choices	Respondents	Experts
First	Save the Most lives	Save the Most lives
Second	Sickest first	Prognosis
Third	First-come, first serve	Instrumental Value
Fourth	Youngest First	Lottery
Fifth	Prognosis	Reciprocity
Sixth	Instrumental Value	Sickest first
Seventh	Lottery	Youngest first
Eighth	Reciprocity	First-come, first-serve

Ordered from 1st choice-most preferred to 8th choice-least preferred

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Figure 2 and 3 also shows which principles are most and least preferred by ethicist and study respondents respectively. This will be discussed further in the discussion section.

Figure 2: Resource allocation guide based on ethicists recommendations

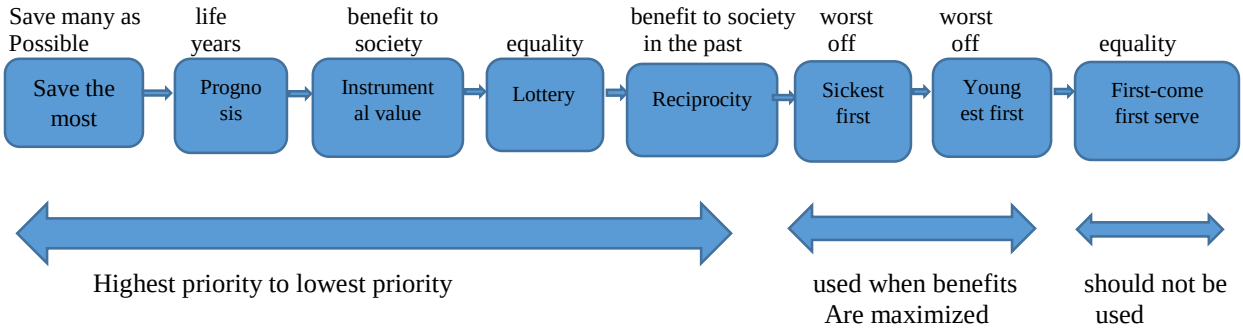
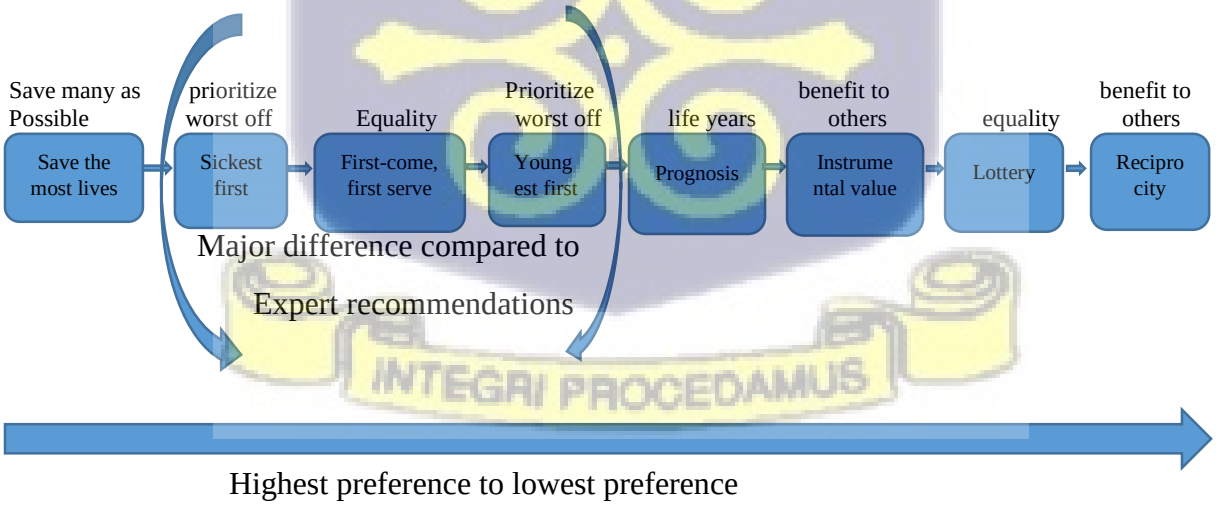


Figure 3: Public preference for the ethical principles for the allocation of scarce healthcare resources from the study



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4.3 Factors influencing preferences of respondents for scarce resource allocation principles

The findings from this study indicate that overall, marital status was highly significant (p= 0.002). It had significant effect on the preferences of respondents. Work status (p= 0.010), belief in the efficacy of traditional medicine (p= 0.033), honesty (p=0.001), health rating (p= 0.004) and the frequency of having a medical checkup (p=0.001), also were highly significant and had significant effects on public's preference for the scarce resource allocation principles (Table 7).

Table 7: Individual factors that significantly influenced the preferences of respondents for scarce healthcare allocation principles

Effect	Model Fitting Criteria			Likelihood Ratio Tests		
	AIC of Reduced Model	BIC of Reduced Model	-2 Log Likelihood of Reduced Model	Chi-square	df	**Sig.**
Gender	926.422	1230.822	772.422	3.027	7	0.883
Education	931.220	1235.620	777.220	7.825	7	0.348
Marital status	945.856	1250.256	791.856	22.461	7	**0.002**
Work status	941.968	1246.367	787.968	18.572	7	**0.010**
Rating of optimism	934.987	1239.387	780.987	11.592	7	0.115
Efficacy of Trad. medicine	938.654	1243.054	784.654	15.258	7	**0.033**
honesty	957.409	1261.809	803.409	34.014	7	**0.000**
Life after death	936.035	1240.435	782.035	12.640	7	0.081
Age	931.311	1235.711	777.311	7.916	7	0.340
Health rating	944.159	1248.559	790.159	20.764	7	**0.004**
Medical checkup	1158.00	1258.642	1110.00	30.846	7	**0.000**

Specifically, factors or differences that influenced respondent to choose a principle of allocation that was not the most favored principle were investigated. 'Save the most lives' is the most preferred principle and was set as the reference category. All other categories or principles, 'sickest first', 'first-come, first-serve', 'youngest first', 'prognosis', 'instrumental value', 'lottery' and

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lottery were compared to the reference category ('Save the most lives') in the Regression model. Various comparisons were made from the multinomial logistic regression model. This is presented in Table 8, and it shows factors that influenced preferences of the public when comparing other principles to save the most lives

Table 8: Multinomial logistic Regression identifying factors that significantly influence respondents' preference for specific allocation principles in comparison to Save the Most lives

principles		B	Std. Error	Wald	df	Sig	Exp(B)	95% Confdence Interval for Exp B Lower Bound	upper Bound
Sickest first	intercept	1.176	3.117	0.142	1	0.706			
	gender	0.077	0.439	0.031	1	0.861	1.080	0.457	2.551
	Education	-.100	0.263	0.145	1	0.703	0.905	0.540	1.515
	Marital status	1.152	0.445	6.695	1	**0.010**	3.164	1.322	7.569
	Work status	-530	0.497	1.140	1	0.286	0.588	0.222	1.557
	Rating of optimism	0.565	0.286	3.910	1	**0.048**	1.760	1.005	3.083
	Efficacy of Trad. medicine	-.207	0.206	1.012	1	0.315	0.813	0.543	1.217
	honesty	-.307	0.266	1.1330	1	0.249	0.736	0.437	1.239
	Life after death	-1.091	0.615	3.144	1	0.076	0.336	0.101	1.122
	Age	0.26	0.020	1.769	1	0.183	1.026	0.988	1.067
	Health rating	-.057	0.017	11.209	1	**0.001**	0.945	0.914	0.977
	Med. checkup	-.133	0.180	0.552	1	0.457	0.875	0.615	1.244
First-come, First-serve	intercept	-.891	2.164	0.170	1	0.681			
	gender	0.360	0.296	1.478	1	0.224	1.434	0.802	2.563
	Education	0.066	0.188	0.124	1	0.724	1.068	0.740	1.544
	Marital status	1.041	0.334	9.704	1	**0.002**	2.831	1.471	5.448
	Work status	-.629	0.339	3.440	1	0.064	0.533	0.275	1.036
	Rating of optimism	0.125	0.196	0.405	1	0.525	1.133	0.772	1.662
	Efficacy of Trad. medicine	0.279	0.147	4.082	1	**0.043**	1.345	1.009	1.179
	honesty	0.037	0.175	0.045	1	0.832	1.038	0.737	1.462

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	Life after death	-1.200	0.404	8.815	1	**0.003**	0.301	0.136	1.462
	Age	-.002	0.016	0.013	1	0.910	0.998	0.967	1.031
	Health rating	-.019	0.014	2.019	1	0.155	0.981	0.955	1.031
	Med. checkup	-.358	0.132	7.328	1	**0.007**	0.699	0.539	0.906
Youngest first	intercept	-9.035	7.029	1.652	1	0.199			
	gender	0.553	0.992	0.311	1	0.577	1.738	0.249	12.139
	Education	0.380	0.717	0.281	1	0.596	1.463	0.359	5.963
	Marital status	0.248	1.138	0.048	1	0.827	1.282	0.138	11.930
	Work status	0.167	1.086	0.024	1	0.878	1.182	0.141	9.921
	Rating of optimism	0.549	0.614	0.798	1	0.372	1.731	0.519	5.766
	Efficacy of Trad. medicine	0.446	0.492	0.822	1	0.365	1.552	0.595	4.098
	honesty	0.187	0.577	0.205	1	0.746	1.206	0.389	3.738
	Life after death	-.754	1.234	0.373	1	0.541	0.470	0.042	5.284
	Age	0.019	0.050	0.138	1	0.710	1.019	0.923	1.125
	Health rating	-.009	0.046	0.040	1	0.842	0.991	0.906	1.084
	Med. checkup	-.300	0.439	0.468	1	0.494	0.740	0.313	1.751
Prognosis	intercept	-6.261	6.736	.864	1	.353			
	gender	0.196	0.776	0.064	1	0.800	1.217	0.266	5.574
	Education	.027	.555	.002	1	0.961	1.028	0.346	3.047
	Marital status	-1.041	.969	1.153	1	0.283	0.353	0.053	2.360
	Work status	3.244	1.280	6.422	1	**0.011**	25.628	2.085	321.959
	Rating of optimism	-.595	.502	1.407	1	0.236	0.551	0.617	1.475
	Efficacy of Trad. medicine	.175	.336	.272	1	0.602	1.191	0.782	2.300
	honesty	.672	.468	2.058	1	0.151	1.957	0.058	4.900
	Life after death	-.423	1.237	.117	1	0.722	0.655	0.944	7.397
	Age	.027	.043	.390	1	0.532	1.027	0.942	1.118
	Health rating	.021	.041	0.267	1	0.605	1.022	0.056	1.108
	Med. checkup	-.423	.740	3.778	1	0.052	0.237	0.539	1.012
Instrumental value	intercept	-8.565	6.760	1.605	1	.205			
	gender	-.225	0.894	0.063	1	0.803	0.709	0.138	4.609
	Education	-.547	0.484	1.278	1	0.258	0.579	0.224	1.494
	Marital status	0.458	1.186	0.149	1	0.700	1.580	0.155	16.167
	Work status	1.087	0.909	1.432	1	0.231	2.966	0.500	17.167
	Rating of optimism	-.2.41	.555	0.189	1	0.664	0.786	0.265	2.332

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	Efficacy of Trad. medicine	0.454	.491	0.855	1	0.335	1.575	0.601	4.123
	honesty	-.010	.533	0.000	1	0.985	0.990	0.349	2.813
	Life after death	-.1.817	0.921	3.893	1	**0.048**	0.163	0.027	0.988
	Age	-.009	.054	0.028	1	0.867	0.991	0.892	1.101
	Health rating	0.077	.054	2.041	1	0.153	1.080	0.972	1.199
	Med. checkup	0.402	0.395	1.034	1	0.309	1.495	0.689	3.245
Lottery	intercept	-8.565	6.760	1.605	1	.205			
	gender	0.426	0.597	0.	1	0.803	0.709	0.475	4.929
	Education	-.821	0.351	1.278	1	0.258	0.579	0.221	0.876
	Marital status	2.085	0.684	0.149	1	0.700	1.580	2.108	30.721
	Work status	0.487	0.691	1.432	1	0.231	2.966	0.420	6.303
	Rating of optimism	0.621	0.362	0.189	1	0.664	0.786	0.916	3.782
	Efficacy of Trad. medicine	-.475	.242	0.855	1	0.335	1.575	0.387	0.999
	honesty	1.868	.432	0.000	1	0.985	0.990	2.778	15.082
	Life after death	-.1.817	0.723	3.893	1	**0.048**	0.163	0.074	1.263
	Age	0.042	.029	0.028	1	0.867	0.991	0.984	1.05
	Health rating	-.021	.022	2.041	1	0.153	1.080	0.937	1.024
	Med. checkup	0.709	0.233	1.034	1	0.309	1.495	1.288	3.207

4.3.1. Comparing Sickest first to Save the Most lives

The 'Sickest first' in comparison with 'Save the Most lives' principle showed that, Marital status (*p*= .010), level of optimism (*p*= .048) and health status (p=.001), were significant predictors. Individuals who were married had an odd ratio of 3.164 compared to the unmarried for choosing 'Sickest first' relative to 'Save the most lives' if all other predictive variables remain constant. This means that, individuals who are married are 3.164 times likelier to choose 'Sickest first' to 'Save the most lives' than those who are not', p =0.10. Participants who were optimistic reported an odd ratio of 1.176 than those who were not for choosing 'Sickest first' to 'Save the Most lives'. If all other predictive variables remain constant, participants who are optimistic will 1.176 times probably choose 'Sickest first' to 'Save the most lives' than those who are not optimistic in life.

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Odds ratio for participants with good health status against those bad status is 0.95. Those with good health status are more probable to choose 'Save the most lives' to 'Sickest first' if every other predictive variable is constant, with p = 0.01

4.3.2 Comparing First-come, first-serve to Save the most lives

Marital status, belief that traditional medicine works, and medical checkup were significant predictors. Also significant was the belief that there is life which was held by participants. The odds ratio for a married person to an individual who is not is 2.831 for preferring 'first-come, first-serve' to 'save the most lives' when every other predictive variable is held constant in the model. It be said that, individual who are married are 2.83 times probable to prefer 'first-come, first-serve' to 'Save the most lives', with p-value = 0.002.

An odd ratio of 1.133 was recorded among individuals who believed that traditional medicine works and individuals who do not believe when all other predictive variable are held constant. Participants who believe that traditional medicine works are 1.133 more probable to choose 'Save the Most lives' than 'first-come, first-serve'.

Among individuals who had belief in the existence of life after death and participants who don't, an odd ratio of 0.301 was recorded. If all other predictive variable remain fixed, individuals who belief life exist after death will more probably opt for 'Save the most life principle' over 'first come, first-serve principle', with p-value = .003. The odds ratio for participants who attend medical checkup to those who do not is 0.699 for preferring 'first-come, first-serve' relative 'Save the most lives', p-value = .007

4.3.3 Youngest first to Save the Most lives

None of the predictors were significant from the regression models. None of the predictor variables were close to significance, p = 0.05

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4.3.4 Prognosis to Save the most lives

From the model, work status (p = .011) was a significant factors. Attending medical checkup was not significant from the model (p = .052). Between employed and unemployed participants an odd ratio of 25.63 was recorded. Holding all other variables constant, people who are employed will more probably choose 'prognosis' over 'save the most lives 25.63 times

Work status is the significant predictor from the model. Whether an individual attends medical checkup is quite close to significance from the model (p = .052). The odds for individuals who are employed to those are not is 25.628 for preferring 'prognosis' relative to save the most lives if all predictor variables remain constant. Participants who are employed are 25.63 more likely than unemployed participants to prefer 'prognosis' to 'save the most lives' (p-value = .011). Also Participants who attend medical checkup are more likely to prefer 'Prognosis'

4.3.5 Instrumental value to Save the most lives

From the model, believing in life after the death is significant, p = .048. Keeping all other variables as they are, individuals who believe in life after death are more likely to choose 'instrumental value' over 'save the most live'

4.3.6 Lottery to Save the most Lives

Education (p=0.019), marital status (p = 0.002), belief in the potency of traditional medicine (p =0.050), rating of honesty (p =0.001) and medical checkup (p =0.002) were all significant. Keeping all other variables unchanged. Participants with higher education are more likely to choose to save the most lives than choose an allocation policy based on lottery based on the odd ratio of 0.440.

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At an odd ratio of 8.047 participants who are not married are more probable to choose an allocation based on Lottery than one based on saving the most lives

The odds ratio for individuals who believe in the success of traditional medicine to those who do not is 0.62 for preferring 'lottery' relative to 'save the most lives', if all predictor variables are held constant. Participants who believe in the success of traditional medicine are more likely to prefer 'save the most lives' to 'lottery' as an allocation guide.

Odds ratio(OR) for honest individuals are honest against individuals who are not is 6.473 for choosing 'lottery' over 'save the most lives', keeping all other predictive variable unchanged. Individuals who are honest are 6.473 more likely to prefer 'lottery'

No predictor was significant from the model when comparing 'Reciprocity' to "Save the most lives". None of the predictor variables were close to significance from the regression model.

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CHAPTER FIVE

DISCUSSION

5.1 Introduction

The discussion of the study is presented in this chapter. It explains what the study found and its significance. This sought to ascertain the preferences of the Ghanaian public for the principles of allocating scarce healthcare resource. It also sought to determine characteristics of individuals which influence their preferences.

5.2 Discussion

The study presents two important results. The first is the ranking of public preference on which ethical principle is most and least preferred for scarce healthcare resource allocation. This can be seen in Table 5. There is significant agreement concerning which principles the general public favored most and least. From the study, "save the most lives" principle which is the preference of the public is the same first choice recommended by bioethicists (e.g. Emmanuel et al., 2020). Both the public sample and experts agree that scarce healthcare resources should be allocated to maximize benefits or utility. This is similar to the findings of Lee et al. (2021). Maximizing the number of lives saved with limited resources available is paramount. The findings of the study points out that, the public seeks to maximize utility. Concerning the principles chosen by the public as highly rated choices, very few of them chose 'lottery' and 'reciprocity' as highly rated choice. The order of preference from the public sample shows a big gap between what ethicists recommend and what the public prefer. This is evident in figure 2 and 3 in the findings section. The 2 figures show a pictorial representation of a guide by both ethicists and respondents on how to steer decision making in the allocation scarce healthcare resources. In both figures it can be seen that decision making at the first level is the same. Both the public and experts choose to maximize

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utility at the population level by saving the most lives. There is however, a divergence in opinion from the two groups from the second to the last level. The public prefer to prioritize those that are worst off (sickest first) at the second level, but the experts propose that the benefits of scarce resources should be continuously maximized by preferring prognosis (maximizing 'life-years'). The findings from the study does not agree with the ethical assertion by Perused et al (2009), that 'sickest first' principle is morally unjustifiable. According to the results from this study, the public showed a high preference for ethical allocation principles based on Prioritizing those that are worst off and 'first-come, first-serve' that is contrary to the views of ethicist. The public prefer an allocation of resources where priority is given to the Sickest and Youngest individuals within the society. This is in agreement with the findings of Grover et al.(2020). The public prefer that, people should be attended to or dealt with in order in which they arrive. However, according to Moodley et. al (2020), people living close to medical facilities may be unfairly favored and individuals needing health care later may be disadvantaged.

'Lottery' as an allocation principle was not highly rated by the public. This is in congruent with findings from Krutli et al.(2016).However experts consider it as a principle that is fair from an ethical viewpoint, because it provides equal opportunity to everyone

The second main findings from the study shows that, there were individual differences that impact on the preferences for an allocation principle. It was found that marital status had significant effect on the preferences of the public. Being employed, honesty, health rating, belief that traditional medicine works and frequency of medical checkup affected the preferences of the public significantly

Individuals who are married preferred prioritize the 'worst off' over saving the greatest number of people. Participants with a good health rating chose the 'save the most lives' principle to the

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'sickest first' principle. Those with bad health rating preferred the 'sickest first' principle to 'save the most lives'. There was no significant difference in preferences between men and women when comparing 'sickest first' to 'Save the most lives'. However findings from Grover et al,(2020), showed women preferred to save those that have rendered worst off through sickness over saving the greatest number of people.

Belief in efficacy of traditional medicine was a significant factor when comparing 'First-come, first-serve' to 'Save the Most lives'. Individuals who believed that traditional medicine works preferred 'Save the Most lives' over 'first-come, first serve'. Also individuals who believe in life after death preferred 'save the most lives' over 'first-come, first-serve'. The only individual characteristic that impacted on the preferences when comparing 'instrumental value' to 'Save the most lives' is the belief in life after death. Those who believe in life after death chose 'Instrumental value' over 'Save the most lives'. In the African setting, people believe in order to earn a good life after death, they need to live morally on earth by complying with both religious and social norms, (Okeke, 2013). People will try as much as possible to make the choices and take the right actions to earn them a good afterlife. Individuals who are married prefer save the most lives over lottery, those with higher level of education prefer save the most lives over 'lottery'. Individuals who reported higher ratings of honesty prefer lottery over 'Save the most lives'.

The results from the study can possibly be elucidated partly in terms of self-interest. In general and particularly in Ghana, individuals who are married are crucial to and have greater responsibilities to their families than those who are not. This could potentially be the reason they prefer 'sickest first' and 'first-come, first-serve' over 'save the most lives', particularly if they contract Covid-19. A study by DiSantostefano & Terris-Prestholt (2020) identified that in the allocation of health resources, higher societal value is placed on individuals who have dependents

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and show healthy behaviors. Individuals who had good health status based on their rating had a preference for 'save the most lives' over 'sickest first'. Those that have bad health status showed a preference for 'sickest first' from the study. Individuals with bad health status are more likely to contract illness during disease outbreak. The effect of any illness with be severe in individuals with bad health status compared to those who have good health status. Prioritizing 'sickest first' over 'save the most lives' will mean that individuals who have bad health status will get early access to treatment and care.

The results from the study can also be elucidated in relation to socio-economic conditions. Income, education and employment affect how well people live. This conditions determine our abilities to afford medical care, go for regular checkups, and afford quality and nutritious food and how well one is able to manage stress. All these affect ones attitude towards health. Results from this study shows that individual who go for medical checkup are mostly those who are employed. They probably would have good medical conditions. These individuals prefer 'prognosis' over 'save the most lives'. This can be attributed to the fact that, they can recover, live long and better lives particularly if they contract Covid-19, than those who are unemployed. Lastly the results can be interpreted in terms of African culture. For instance, Elders are accorded higher status within many African societies. They were the most affected during COVID-19, (Schoch-Spana et al, 2020). Ghanaian norms and values focuses on protecting the sick and vulnerable in society. This might explain why Sickest first is the second most preferred allocation principle of the public.

According to Krutli et al.(2016), many ethicists reject 'Sickest first', stating that the allocation principles is morally unjustifiable, but this allocation principle received a high endorsement from the lay public and health professionals. They state that "Decision makers are advised to consider

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whether or not to give ethicists, health professionals, and the general public an equal voice when attempting to arrive at maximally endorsed allocations of scarce medical resources."

A high majority of populations in Sub-Saharan Africa suffer health inequities, have poorer health conditions and are more susceptible to an outbreak of disease. This class of people have bad health indicators and are likely to get sicker than the few minority group who are well off. Rejecting the 'Sickest first' principle in this context will greatly disadvantage this majority group and further worsen health inequity. On the contrary adopting the 'Sickest first' principle could be ethically justified on the grounds of social justice and maximizing benefits. According to Moodley et al, (2020), when adopted, majority of people within LMIC who have been marginalized socially and economically will be prioritized. People with underlining health conditions are also more likely to be Sicker during disease outbreak. The 'Sickest first' ethical principle will maximize the chance of survival.

5.3 Limitation of Study

This study used a method called rank ordering which puts some limitation on the type analysis one can conduct.

Although the study population was very broad, the sample selected was small. This may have led to 50% of the participants being graduates, which is a selection bias. Also the size of the sample raises some concern on the generalizability of the study results

Lastly, an orientation was provided for the respondents. However, it cannot be said that the orientation was exhaustive considering the mode of orientation (via internet). This could have affected the choices or preferences of the respondents.

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CHAPTER SIX

CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

Majority of the Respondents chose 'Save the most lives' as the most preferred ethical principle for the allocation of scarce healthcare resources during COVID-19. The second most preferred ethical principle was 'Sickest first' followed by 'First-come, first-serve', 'Youngest first', 'Prognosis', 'Instrumental value', 'Lottery' and 'Reciprocity'. Experts in the field of bioethics recommend 'Prognosis' and 'Instrumental value' as second and third preferred ethical principle. The respondents however chose 'Sickest first' and 'First-come, first-serve'. This shows disagreement between the general public and experts recommendations. The agreement between the sample from the general public and ethicist at the first level, that scarce resources should be allocated to maximize benefit suggest that foreign ethical guidelines can be adopted and implemented within the Ghanaian setting. However the degree of disagreement at the second and third level regarding the ethical principles suggest that engaging the public does really matter in developing public health policies. Guidance informed by how scarcity decision in Ghana have been made for decades is what is required. Guidelines developed through a transparent and community-engaging process must include shared Ghanaian cultural values.

Predictors that generally influenced the preferences of Respondents included Marital and Work status. Other factors that significantly influenced individual preferences included honesty, health rating, belief in the efficacy of Traditional medicine and the frequency of having medical checkups

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The effects of these predictors are a product of the Ghanaian context. By taking our local Ghanaian context into consideration, practical ethical guidelines can be framed. Policymakers should do this together with bioethicists, physicians, health professionals and the lay man, so an equitable and practical guideline which promotes justice can be established.

The execution of scarce health care resource allocation guidelines must be consistent. It should be without any kind of prejudice. Individuals put in charge to execute guidelines must be fair at all times.

6.2 Recommendations

Majority of the respondents believed that the Ghanaian health facilities are under resourced. Healthcare providers face the ethical challenge of deciding who gets access to treatments and care. The Ministry of Health in Ghana must therefore work on the establishment of Clinical Ethics Committees at the regional and district level to help hospitals and healthcare givers make policies and protocols. This will provide a clinical standard in the care and treatment of patients, and the fair distribution of scarce healthcare resources.

The degree of disagreement between the sample and ethicists at the second level implies that community engagement is key in developing any kind of recommendation or policy. As a country we have very limited healthcare resources. No one knows when the next pandemic might struck. It is therefore important for Ghana to develop context specific guidelines to allocate scarce healthcare resources in anticipation of the next pandemic

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APPENDICES

Appendix I: Participants Information Sheet

Title: Principles for the allocation of scarce healthcare resources during the covid-19 pandemic: Public preferences in comparison with Ethicists' recommendations in Greater Accra

General Information about Research

Health care resources such as beds and vaccines are not in adequate supply during health emergencies such as the COVID-19 pandemic. Health people have to make hard decision when they have to choose who to treat or who should have access to care and treatment. This is because there so many people who needs treatment that is limited. Health professionals have developed guidelines or strategies on how these healthcare resources can be shared and who can have access to care. This study is a research on what the views and preferences or choices of the general public are concerning the guidelines or strategies provided by health people. It also seeks to identify the factors which influences the choices of individuals within the general public. Most of the guidelines and strategies developed by the health people have not considered the views of the general public. There must be some level of agreement between the views of health and medical people and that of the general public. If the views of the public are considered when these guidelines or strategies are developed, it will increase their willingness to accept these strategies. It will help health professionals develop fair and effective guidelines on how to share limited healthcare resources during emergencies Participant participation will last for 5-10 minutes after participants have agreed to take part in the study.

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This is an online Survey and questionnaire will be administered using KoboToolbox. Invitation letters to participate in the online study will be sent to individuals who reside within Greater Accra on public social media platforms or groups (Twitter, Whatsapp and Facebook). 24 Individuals who respond to the invitation will be sent the informed consent form and the survey link to answer the questionnaire

Possible Risks and Discomforts.

There are no foreseeable risks or discomfort to the study participants Possible Benefits There are no direct benefits to study participants. However the results of this study will help health policy makers develop effective guidelines how to allocate scarce healthcare resources during health emergencies. This will be to the benefit of the country's healthcare system and will indirectly benefit participants and our societies

Confidentiality

Your identity, personal information, responses will not be disclosed to anyone outside the research team. Information about you will be protected to the best of our ability. Data collected from you will be stored on a hard drive and locked in a cabinet. Data collected from you will be destroyed 6 months after the study.

Compensation

There are no compensations with regards to this research. However results of the study will be communicated to participants after the study Voluntary Participation and Right to Leave the Research Participation in this research is voluntary, you have the right to withdraw without any penalty from this study even after you have consented to participate. Should you decide to leave halfway through the study, your data will not be included in the study and destroyed.

Contacts for Additional Information

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If you have pertinent question about this research, please submit a question via e-mail :(nyamenosi@gmail.com) or on whatsapp (https://wa.me/233577786518)

Your rights as a Participant

This research has been reviewed and approved by the 37 Military Hospital Institutional Review (37MH-IRB). If you have any questions or further information about research participant you 25 can contact the IRB Office between the hours of 7:30am-2:00pm through the Office mobile phone: 0591759506 or email addresses: irbmilhosp@gmail.com

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Appendix II

VOLUNTEER AGREEMENT

I have read and understood the above document describing the benefits, risks and procedures for the research title (Principles for the allocation of scarce healthcare resources during the covid-19 pandemic: Public preferences in comparison with Ethicists' recommendations in Greater Accra.)I have been given an opportunity to have any questions about the research answered to my satisfaction. By completing this questionnaire, I am giving my consent to participate as a volunteer. Please print or save a copy for your records.

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APPENDIX III

QUESTIONNAIRE

Principles for Scarce Resource Allocation Questionnaire.

sex: Male …… Female …….. Region …….

Age: …… Education level: ……..

Marital Status: …… Work status.....

Are you a healthcare worker or professional? YES ☐ NO ☐

Section 1

Instructions: Please read each comment carefully and tick within the table the number that represents your degree of agreement or disagreement with each statement where

1 = not at all, 2 = only a little, 3 = to some extent, 4 = rather much, and 5 = very much

Questions	1	2	3	4	5
1. How Optimistic are you?					
2 Do you believe traditional medicine works?					
3 How honest are you					
4 How often do you go for routine medical checkup					

Answer the following statements by Ticking YES or NO

	yes	**no**
6 Do you believe in life after death		
7 Have ever been denied care or treatment due to lack of medical resources such as Bed or medication		
8 Do you self-medicate		
9 Do you believe our health facilities are we resourced		

How will you rate your health status on a scale of 1 to 100: ……

Section 2

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Every health care system needs materials, equipment and staff (e.g. medications, vaccines, hospital beds, and the health workers themselves etc) to provide care. However, these items and people are usually not in adequate supply. Medical people often have to make hard choices when they have to choose who to treat because there are too many people wanting treatments that limited. As a result, ethicists have come up with different systems, strategies, or principles. A recent study suggests there are essentially eight principles that may be used to allocate scarce medical interventions. This study is about how to make decision about the scarce materials and staff are shared out when many people need it at the same time.

In this questionnaire, we are interested in your views on which principles you personally would advocate or support. We would like you to rank order these. Please read through all eight then put a 1 (meaning most preferred) against the one you think is best/fairest. Then, put a 2 against the principle you think next fairest. Continue until you have ranked all eight.

RANK (1–8)

_____ Lottery: the random allocation of interventions, by randomly picking recipients without knowing who they are, they can be selected through drawing through drawing recipients blindly.

_____First-come, first-served: allocating interventions based on the order of request, or needed.

_____Sickest first: prioritizing those with the worst future prospects if left untreated.

_____Youngest first: prioritizing those who have had the least life years, and thus have the potential to live longer if cured.

_____Save the most lives: aiming to save the most individual lives possible, through offering all people treatment.

_____Prognosis or life-years: aiming to save the most life-years, thus prioritizing those with positive prognoses, and excluding those with poor prognoses.

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_____Instrumental value: prioritizing those with specific skills and usefulness – for example, those producing a vaccine, or those who have agreed to improve their health following treatment and thus requiring fewer resources (stop smoking, lose weight, etc.)

_____Reciprocity – prioritizing those who have been useful in the past – for example, past organ donors.