Moral Judgments and Triage Principles related to COVID-19 Pandemic

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Abstract

The present study explores moral judgment in COVID-19 related moral dilemma situations involving allocation of ventilators with conflicting allocation principles. Utilitarian triage criteria like the chance of recovery or longer life expectancy are opposed to egalitarian procedures like random allocation and 'first come, first served'. In the first part of the experiment, participants are presented with three hypothetical situations in which there are two patients admitted to a hospital in a critical state needing a ventilator but only one is available. The conditions about the patients are described and several triage procedures are suggested and rated by participants. Separately, participants rated their agreement with several triage principles. The result shows a clear preference for utilitarian allocation principles. The random allocation principle receives the lowest ratings. The 'first come, first served' correlates with the belief in fate score hinting that the egalitarian nature of this principle is questionable.

Keywords: moral dilemmas, ethical dilemmas, triage, utilitarianism, moral judgments

Moral Judgement and Triage

Moral judgment, the questions of right and wrong, which actions are morally justified, etc. are extensively studied in the field of philosophy and psychology. The main tools in these studies are thought experiments in which participants are presented with the description of hypothetical situations that present a moral dilemma (Foot, 1967; Cushman et al., 2006). The use of such hypothetical situations has sometimes been criticized due to concerns about the lack of ecological validity of the results (Bauman, 2014).

Unfortunately, the pandemic of COVID-19 has led to real moral dilemmas related to the lack of medical resources (medical staff, ventilation devices, etc.) and the problem of their fair distribution. The choice between two or more patients to allocate a single ventilator is an example of the so-called 'triage' and in most cases is a choice of life and death.

The triage problem has been considered long before the present pandemic and the tragic events related to the COVID-19 pandemic led to a review and reassessment of existing tirage rules and their alignment (Christian et al., 2006; Biddison et al., 2019, Joebges & Biller-Andorno, 2020). The medical standards prioritize the utilitarian triage rules aimed at maximizing benefit – maximizing number of lives saved (assessed using short-term survival prognosis and chances of recovery), maximizing life-years saved (assessed using long-term survival prognosis taking into account age and comorbid conditions), providing opportunity to experience the whole life cycle, maximizing broad social value (general worth to the society), maximizing narrow social value (special skills or qualification, and function which is essential to prevent a great number of deaths), etc. (White et al., 2009). Other principles are egalitarian like 'first-come, first-served' principle or using random choice as they provide equal chance for everybody disregarding any personal characteristics like age, social status, short- and long-term prognosis, etc. (Wilkinson et al., 2020).

These egalitarian allocation principles are controversial. In White et al. (2009), they are not recommended based on not being utilitarian and ensuring the ethical principal of the greatest good for the greatest number. On the other hand, Winsor et al. (2014) have selected the above two principles out of 13 considered arguing that they counter-balance the usual utilitarian approach and should be considered as supplementary triage rules when utilitarian criteria alone do not allow a choice.

The problem of withdrawal vs. withholding of a resource is also a controversial one (Sulmasy & Sugarman, 1994). One line of reasoning says that if it is morally permissible to withhold a resource then it is morally permissible to withdraw it if it has been allocated. Others claim that withdrawing and withholding a therapy are not equivalent because the decision to allocate the resource has already been made and therefore there is a moral commitment.

All these discussions about the moral aspects of triage procedures have led to studies motivated by the beginning of the COVID-19 pandemic and carried out in the first months of the pandemic. Huang et al. (2020), for instance, considered dilemmas in which they studied the utilitarian principle of choosing the younger patient and the 'first come, first served' principle. They demonstrated that using the 'veil-of-ignorance' (a principle which makes people make a choice for a situation in which they do not know in which position they will be) reasoning shifts the choices towards using the utilitarian principle. Another interesting study (although not yet published when the current study was designed and conducted) is the one of Wilkinson et al. (2020). They studied the preferences for utilitarian principles and for random allocation. Their findings show that in general participants favor utilitarian principles, and only when the two patients are very similar, random allocation is favored.

Goals and Hypothesis

The goal of the present study is to investigate moral judgment in COVID-19 related moral dilemma situations – dilemmas involving scarce resources and a conflict between several possible allocation principles. We are interested in studying moral judgments in dilemmas opposing different allocation criteria. The utilitarian principles of greater chances of recovery or longer life expectancy are opposed to the egalitarian principles of random allocation and 'first come, first served' principles.

Additionally, we are interested in studying the moral judgments in withdrawal and reallocation situations.

Our expectations were that the utilitarian principles will receive more support than the egalitarian. However, in the reallocation dilemmas, we expected that the decision already made will get higher support and the preferences will be shifted away from the utilitarian choice.

In our opinion, the egalitarian principles 'first come, first served' and random allocation deserve special attention. As discussed earlier, they are considered by some as being similar and to be preferred (see Winsor et al., 2014) but by others potentially leading to discrimination (WHO, 2020). Another aspect of the 'first come, first served' principle is its frequent occurrence in normal everyday situation and is perceived as the natural one and it is chosen in by many people in dilemma situations (Huang et al., 2020; Hristova & Grinberg, 2021). This principle is also preferred to random allocation strategy by a huge majority of the participants (our previous study). Because of that we think that those two principles are related to different moral principles and that they are not considered by people as instances the same type of egalitarian rule. We hypothesize that endorsement of the 'first come, first served' principle (but not the random allocation principle) will be related to the individual belief in fate.

Last but not least, the study was designed to capture the dynamics of moral judgments in a period of several months as the situation with the COVID-19 was also evolving. The goal was to explore the moral judgments for allocation decisions when the triage situations are still hypothetical and when (due to the development of the pandemics) there are many more COVID-19 cases (the chances of catching the disease are much higher and those situations are no more hypothetical but real). In the latter case, we hypothesized that moral judgments will be more utilitarian. The justification for such a hypothesis stems from studies using the so-called 'veil of ignorance' reasoning (e.g. Huang et al., 2020) as the increasing severity of the pandemic provided an ecological way to implement that type of reasoning.

Method

Stimuli and Design

The experiment had three parts. In the first part we presented moral dilemmas opposing different allocation principles. In the second part several allocation principles were presented for rating. In the third part (not reported here) various criteria that could be used in a scoring system for prioritizing patients in triage situations were rated. Finally, there were questions about belief in fate and religiosity (religiosity is not reported here).

Data is collected in Bulgaria during two time periods. The first period is during the first months of the pandemic when the local situation was stable with not so many COVID-19 cases (18 June –17 July 2020, called further Period 1). During Period 1 the average 14-days death rate from Covid-10 was about 0.5 people in 100 000. The second data collection period was about 6 months later when the local situation was characterized by a much larger number of new cases, deaths, and real triage situations (21 December 2020 – 4 January 2021, called further Period 2). The 14-days death rate during Period 2 was almost 60 times larger – 28 people in 100 000.

All the materials were in Bulgarian.

In the first part of the experiment, three moral dilemmas were used in which two patients meeting different triage criteria need ventilators to have a chance to recover. The dilemmas are similar to the one used in Huang et al. (2020), however, we use three dilemmas in which several utilitarian principles (not just the age of the patients) are presented. Also, there are 3 or 4 possible allocation choices (not just two) in which 'first come, first served' and random allocation principles are possible choices.

After reading the dilemma scenarios, the participants must rate the suggested choices and reasons to allocate the ventilator. Ratings are given on a 7-point scale anchored with two labels – '1 = completely disagree' and '7 = completely agree'.

In the first dilemma, participants must choose between the utilitarian principle of *greater chance of recovery*, the *first-come, first served* principle, and the egalitarian principle of *random* allocation. In this scenario, one of the patients has lower chances of recovery but has been admitted earlier than the other patient.

> *Dilemma 1*: [Two critically ill COVID-19 patients are admitted to a hospital in a small town. For each of them, the only chance of survival is to be put on a ventilator. There is only one ventilator available and the doctors must decide which patient will get it]:
> *Patient A* is a 49-year-old man with low chances of recovery even if put on a ventilator. He was admitted to the hospital 20 minutes earlier than the other patient.
> *Patient B* is a 49-year-old man with high chances of recovery if put on a ventilator.

Participants rate their agreement with the following possible decisions:

- The ventilator should be given to Patient A because he was admitted to the hospital earlier (*first come, first served* principle).
- The ventilator should be given to Patient B because he has higher chances of recovery (utilitarian principle – *greater chances of recovery*).
- It should be chosen at random which of the patients gets the ventilator (egalitarian principle – *random allocation principle*).

The second dilemma tested the *greater life expectancy* principle opposed to *first come, first served* principle and *random allocation*. In the scenario used, both patients have equal chances of recovery, but one of the patients is admitted earlier while the other patient is *younger* and has longer *life expectancy*:

> *Dilemma 2*: [The same as in Dilemma 1]:
> *Patient A* is a 65-year-old man who is expected to live another 15 years on recovery. He was admitted to the hospital 20 minutes earlier than the other patient.
> *Patient B* is a 25-year-old man who is expected to live another 55 years on recovery.

Participants rate their agreement with the following possible decisions:

- The ventilator should be given to Patient A because he was admitted to the hospital earlier (*first come, first served* principle).
- The ventilator should be given to Patient B because he is expected to live longer on recovery (utilitarian principle – *longer life expectancy*).
- It should be chosen at random which of the patients gets the ventilator (egalitarian principle – *random* allocation).

The third dilemma describes a situation like the one in Dilemma 1 but the patient who is admitted earlier is admitted 2 hours ago instead of 20 minutes ago. Additionally, and more importantly, preparations for putting him on a ventilator have already begun. This manipulation aimed at testing participants' agreement with the utilitarian principle of *reallocation* of resources. As the pandemic has started at the time of the study and the triage was a highly sensitive topic, the choice was made not to use a situation describing a reallocation scenario in which one of the patients is already put on a ventilator. Instead, a milder form was used in which the possible choice is to stop the preparations for using a ventilator after its allocation to a patient.

The third dilemma reads:

> *Dilemma 3*: [The same as in Dilemma 1]:
> *Patient A* is a 52-year-old man with low chances for recovery even if put on a ventilator. He was admitted to the hospital 2 hours earlier than the other patient and preparations have begun for him to be put on a ventilator.
> *Patient B* is a 52-year-old man with high chances for recovery if put on a ventilator.

Participants rate the same 3 possible decisions as in Dilemma 1 with an additional option:

- The ventilator should be given to Patient A because the preparations have already begun for him to be put on a ventilator (*reallocation avoidance* principle).

In the second part of the study, several possible allocation principles are presented one by one and the participants are asked to rate their agreement with each of them using the same 7-point scale. The principles rated are the following – *random allocation*, *first come, first served*, *greater chances of recovery*, *longer life expectancy*, and *better quality of life*.

Finally, there were three questions related to fatalism and belief in fate that were rated on the same scale:

- I believe in fate.
- One cannot escape their destiny.
- Good and bad things happen because they were meant to happen.

We also included two questions to control for attention and understanding of the scenarios presented.

Participants and Procedure

The study was conducted online during two time periods using Bulgarian participants. Period 1 data collection took place in the period 18 June – 17 July 2020. Period 2 data collection was carried out during the period 21 December 2020 – 4 January 2021.

As explained above, during Period 1 there were almost no COVID-19 cases and COVID-19 related deaths in Bulgaria. While Period 2 was during a big wave of COVID-19 related cases, just after the pick of that wave.

The link for the survey was shared using social networks (Period 1 & 2) and a university participants pool (Period 2). The participation was voluntary and/or for a course credit.

During Period 1, 96 participants took part in the experiment of which 20 were removed (20.8%) due to failure to answer correctly the control questions. Among the remaining 76 participants, 57 are female (19 male), 41 students (35 non-students). Their age was between 18 and 67 (M = 31.3, SD = 12.4, 18 – 67).

During Period 2, 93 people participated of which 16 were removed (21.5%) due to failure to answer correctly the control questions. Additionally, the data of 18 participants have been removed because they have participated in the Period 1 study or in a similar study. As a result, 59 participants were included in the analysis – 54 female (5 male), 35 students (24 non-students). Their age was between 18 and 61 (M = 32, SD = 12).

Results

Dilemma 1 – Chances of recovery

The results for the agreement ratings for different allocation choices in Dilemma 1 are presented in Table 1.

Table 1: Average ratings of agreement with allocation choices in Period 1 and 2 in Dilemma 1.

Allocation choice	Period 1		Period 2	
	M	SD	M	SD
Patient A – Admitted first	3.4	1.9	3.4	1.9
Patient B – Greater chances of recovery	5.4	1.8	5.1	1.9
Random	2.2	1.8	2.2	1.6

The agreement ratings for the allocation choices were analyzed in a repeated-measures ANOVA with *allocation choices* (*admitted first* vs. *greater chances of recovery* vs. *random allocation*) as a within-subject factor and *time period* (*Period 1* vs. *Period 2*) as a between-subjects factor.

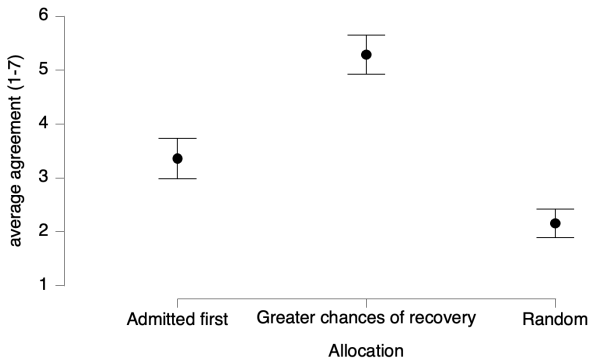

Figure 1: Averaged agreement ratings for allocation choices in Dilemma 1 over Period 1 and 2. Error bars represent 95% CI.

There was no interaction between the factors (p = .86) and there was no main effect of *time period* (p = .35). The analysis revealed a main effect of *allocation choice* (F(2, 272) = 82.82, p < .001, η^2 = 0.337). Post-hoc tests (Holm correction applied) show that all differences between the three allocation choices are statistically significant (all p's < .001).

The allocation of a ventilator to the patient that has greater chances of recovery is preferred (M = 5.3, SD = 1.9) to allocation to the patient that is admitted first (M = 3.4, SD = 1.9). Allocation using a random choice gets lowest support (M = 2.2, SD = 1.7) (Figure 1).

Dilemma 2 – Life expectancy

The results for the agreement ratings for allocation choices in Dilemma 2 are presented in Table 2.

Table 2: Average ratings of agreement with the allocation choice in Period 1 and 2 for in Dilemma 2.

Allocation choice	Period 1		Period 2	
	M	SD	M	SD
Patient A – Admitted first	3.5	1.9	3.4	1.8
Patient B – Longer life expectancy	4.9	1.8	4.7	2.0
Random	2.3	1.8	2.5	1.8

The agreement ratings for the allocation choice were analyzed in a repeated-measures ANOVA with *allocation choice* (*admitted first* vs. *longer life expectancy* vs. *random allocation*) as a within-subject factor and *time period* (*Period 1* vs. *Period 2*) as a between-subjects factor. There was no interaction between the factors (p = .77) and no main effect of *time period* (p = .58). The analysis revealed a main effect of *allocation choice* (F(2, 272) = 82.82, p < .001, η^2 = 0.21). Post-hoc tests (Holm correction applied) show that all differences between the three allocation choices are statistically significant (all p's < .001).

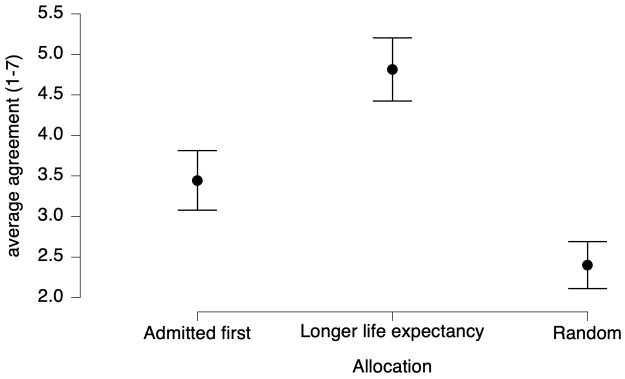

Figure 2: Averaged agreement ratings for allocation choices in Dilemma 2 over Period 1 and 2. Error bars represent 95% CI.

Ventilator allocation to the patient that has greater life expectancy is preferred (M = 4.8, SD = 1.9) to allocation to the patient that is admitted first (M = 3.4, SD = 1.9), and allocation using a random choice gets lowest support (M = 2.4, SD = 1.8) (Figure 2).

Dilemma 3 – Chances of recovery and Preparation started

Table 3 displays the average agreement ratings for the allocation choices in Dilemma 3.

Table 3: Average ratings of agreement with the choice of patient in Period 1 and 2 for in Dilemma 3.

Allocation choice	Period 1		Period 2	
	M	SD	M	SD
Patient A – Admitted first	3.7	2.0	3.37	1.8
Patient A – Preparations have began	4.5	1.9	4.01	1.8
Patient B – Greater chances of recovery	4.4	1.9	4.5	1.9
Random	2.1	1.7	2.4	1.7

The agreement ratings for the allocation strategies were analyzed in a repeated-measures ANOVA with *allocation choice* (*admitted first* vs. *allocation preparations* vs. *greater chances of recovery* vs. *random allocation*) as a within-subject factor and *time period* (*Period 1* vs. *Period 2*) as a between-subjects factor. There was no interaction between the factors (p = .42) and there was no main effect of *time period* (p = .66). The analysis revealed a main effect of *allocation choice* (F(3, 399) = 35.96, p < .001, η^2 = 0.178). Post-hoc tests (Holm correction applied) show that all differences between the four *allocation principles* are statistically significant (all p's < .05) except for the difference

between *greater chances of recovery* and *allocation preparations* ($p = .4$).

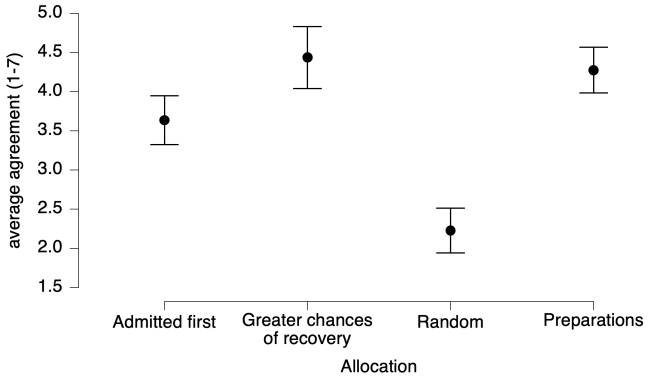

Figure 3: Averaged agreement ratings for allocation choices in Dilemma 3 over Period 1 and 2. Error bars represent 95% CI.

As seen from Figure 3, allocation to the patient that has greater chances of recovery (M = 4.4, SD = 1.9) and to the patient for which the allocation preparations have begun (M = 4.3, SD = 1.8) are preferred to allocation to the patient that is admitted first (M = 3.6, SD = 1.9). Allocation using a random choice gets the lowest support (M = 2.2, SD = 1.7).

Comparison of the Results for the Dilemmas 1-3

In order to compare the general preferences for an allocation principle in a dilemma situation, aggregated data for all 3 dilemmas are analyzed about the three common allocation principles – *first come, first served*, *utilitarian* (chances of recovery, life expectance, and allocation preparations), and *random allocation*. Although the dilemmas are different, and especially the utilitarian principles are different, it is an informative comparison.

The agreement ratings for the allocation strategies were analyzed in a repeated-measures ANOVA with *allocation choices* (*admitted first* vs. *utilitarian* vs. *random allocation*) and *dilemma* (*Dilemma 1* vs. *Dilemma 2* vs. *Dilemma 3*) as within-subject factors and *time period* (*Period 1* vs. *Period 2*) as a between-subjects factor. There was a main effect of *dilemma* ($p = .024$), a main effect of *allocation choice* ($p < .001$) and an interaction between *allocation choice* and *dilemma* ($p < .001$). No other main effect or interaction were significant.

For the agreement with the *first come*, *first served* allocation choice there are no significant differences between the dilemmas (all *p's* > .474).

For the *random* allocation choice there are no significant differences between the dilemmas (all *p's* > .408).

However, there are significant differences between the dilemmas for the *utilitarian* allocation choice: the utilitarian principle in Dilemma 1 (*greater chances of recovery*) received higher agreement ratings (M = 5.3, SD = 1.9) than the utilitarian principle in Dilemma 2 (*longer life expectancy*) (M = 4.8, SD = 1.9), $p = .015$, and then the same utilitarian choice (*greater chances of recovery*) in Dilemma 3 (M = 4.4, SD = 1.9), $p < .001$. No significant difference was found between agreement ratings about the utilitarian choices in Dilemma 2 and Dilemma 3 ($p = .105$).

Rating of Allocation Principles

As explained earlier, in the second part of the study the various allocation principles are presented for agreement rating on a scale from '1 = completely disagree' to '7 = completely agree'.

The average ratings are presented in Table 4. Repeated-measures ANOVA with *allocation principle* (*chances of recovery* vs. *life expectancy* vs. *quality of life* vs. *first-come-first-served* vs. *random allocation*) as a within-subjects factor and *time period* (*Period 1* vs. *Period 2*) as a between-subjects factor. There was no interaction between the factors ($p = .65$) and there was no main effect of *time period* ($p = .63$). There was a main effect of the *allocation principle* ($F(4, 532) = 59.997$, $p < .001$, $\eta^2 = 0.178$). Post-hoc tests show that all differences are statistically significant (all *p*'s < .025) except for the difference between *first come, first served* principle and the *quality of life* principle ($p = .296$).

Table 4: Agreement ratings for various allocation principles in Period 1 and 2, part 2 of the experiment.

Allocation Principles	Period 1		Period 2	
	M	SD	M	SD
Chances for recovery	5.2	1.7	4.8	1.8
Life expectancy	4.5	1.7	4.4	1.8
Quality of life	4.0	2.0	3.8	1.9
First come, first served	3.6	1.8	3.8	1.9
Random	2.0	1.5	2.1	1.5

In Figure 4, the results for the agreement ratings averaged over Period 1 and 2 are shown.

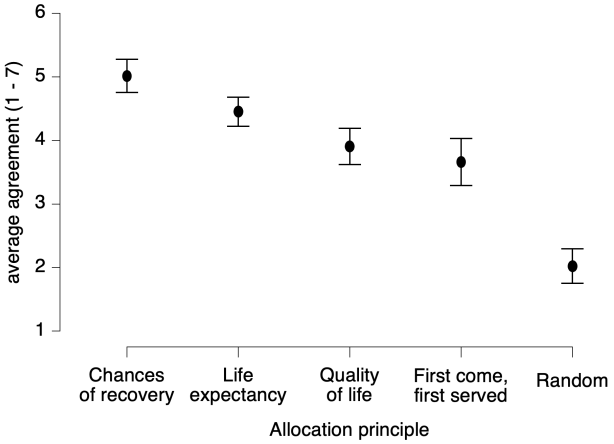

Figure 4: Average agreement ratings for allocation principles over Period 1 and 2. Error bars represent 95% CI.

The *allocation principle* based on *greater chances of recovery* is the most agreed with (M = 5.0, SD = 1.8) followed by the *greater life expectancy* principle (M = 4.5, SD = 1.7). *Greater quality of life* (M = 3.9, SD = 2.0) and the *first come, first served* principle (M = 3.7, SD = 1.9) get lower support. The *random allocation principle* is found to be the least supported (M = 2.0, SD = 1.5).

Further, there were statistically significant positive correlations between the ratings for the three utilitarian principles (**r** between .35 and .66, $p < .001$) (Figure 5). The ratings for the *first come, first served* principle were negatively correlated with the utilitarian principles of *greater chances of recovery* (**r** = – .33, $p < .001$) and *greater life expectancy* (**r** = – .25, $p = .004$). The correlation between the *first come, first served* principle and the *better quality of life* principle is also negative, but not statistically significant (**r** = – .15, $p = .094$). There were no significant correlations between the ratings of the *random allocation principle* and any of the other principles (**r** between – .017 and 0.1, all $p > .23$).

The result demonstrates another reason to consider the '*first come, first-served principle*' to be different from all other allocation principles and from the random allocation principle.

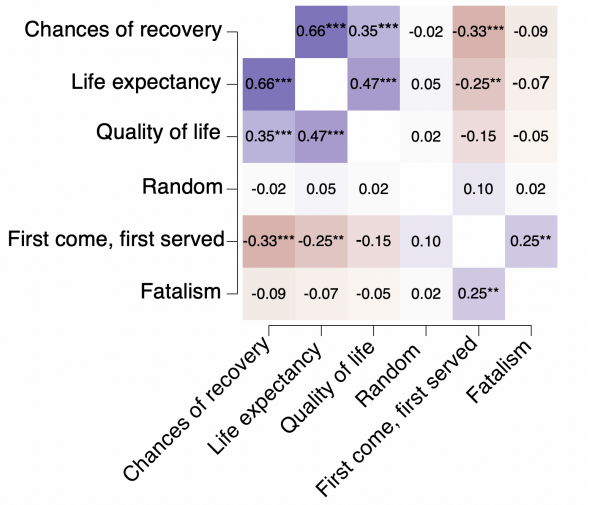

Figure 5: Pearson's correlations among allocation principles (* – $p < .05$, ** – $p < .01$, *** – $p < .001$).

As mentioned earlier, three questions were used to measure fatalism and belief in fate. A good fatalism scale reliability was obtained (Cronbach's $\alpha = 0.89$, 95% CI [0.85 – 0.92]).

Correlations between the fatalism scale and each of the allocation principles are computed and shown in Figure 5. The fatalism score has a positive correlation with the endorsement of the *first come, first served* allocation principle (**r** = .25, $p = .004$). At the same time, it did not show any other significant correlations with the rest of the allocation principles.

Factor analysis of the ratings of each of the 5 allocation principles was also conducted. Using JASP 0.14.1 (JASP Team, 2020), an exploratory factor analysis using maximum likelihood estimation and oblimin rotation was performed. Kaiser-Meyer-Olkin measure of sampling adequacy was .66, and Bartlett's test of sphericity was significant ($\chi2$ (10) = 126.47, $p < .001$). Using a scree plot, a factor solution using 2 factors was chosen (RMSEA = 0). Factor loadings are presented in Table 5.

Table 5: Factor loadings and uniqueness for each of the allocation principle as a result of EFA.

	Factor 1	**Factor 2**	**Uniqueness**
Life expectancy	**0.97**	0.05	0.10
Chances of recovery	**0.60**	-0.25	0.45
Quality of life	**0.49**	-0.01	0.76
First come, first served	-0.01	**0.63**	0.60
Random	0.14	0.22	0.96

Note. Applied rotation method is oblimin.

This two-factor solution explained 42.8% of the variance (Factor 1 explained 31.9%, and Factor 2 – 10.9% of the variance). The correlation between the factors was – .59. Factor 1 loaded on the utilitarian principles for allocation (*greater life expectancy*, *greater chances of recovery*, and *better quality of life*), Factor 2 loaded on the '*first come, first served*' principle. This analysis supports the conclusion already made above about the difference between *first come, first served* principle and *random allocation* as the latter was characterized with uniqueness closer to 1 and was not associated with any of the factors.

Discussion and conclusion

The results of the study show that triage criteria can be grouped in three groups. The first group consists of the utilitarian allocation principles (allocation of limited resources to be for the patient with greater chances of recovery, greater life expectancy, and better quality of life). The principles in the group reach the highest level of agreement which is consistent with previous research (Huang et al., 2020; Wilkinson et al., 2020). Moreover, the agreement ratings for these principles correlate positively among themselves. The highest rating is attributed to the chances of recovery.

However, when the dilemma states that the preparations had already began for the patient admitted first, the support for the utilitarian allocation is lower. Although from a normative point of view it is considered that allocation and reallocation of limited resources should be done using the same criteria, these results demonstrate again that in fact those two situations are perceived as not being the same and as requiring different allocation strategies.

The 'first come, first served principle' has average agreement ratings and correlates negatively with all utilitarian principles. It also positively correlates with fatalism scores and this result demonstrates that it is not perceived as an egalitarian principle and deserves special attention and further research.

The random resource allocation gets the lowest agreement ratings and does not correlate with any of the other principles.

Our research reported in this paper and other recent papers investigating the public opinions on triage procedures during the COVID-19 pandemic demonstrate the interest in this topic. This is understandable as unfortunately many people experience the impact of triage procedures on themselves and on members of their families. This is an opportunity to raise the awareness in the society of the existence of such procedures and involve its members in establishing the future acceptable standards in this domain.

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