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Examining hospital staff members' preferences for allocating a ventilator to a COVID-19 patient with and without Alzheimer's disease

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ABSTRACT

The COVID 19 pandemic has led to an increase in the number of patients in need of ventilation. Limitations in the number of respirators may cause an ethical problem for the medical and nursing staff in deciding who should be connected to the available respirators. We conducted a cross-sectional survey among a convenience sample of 278 healthcare professionals at one medical center. They were asked to rank their preference in respirator allocation to three COVID-19 patients, one 80 years old with no cognitive illness, one 50 years old with Alzheimer's disease (AD), and one 80 years old with AD. Most respondents (75%) chose the 80-year-old AD patient as last preference, but were evenly divided on how to rank the other two patients. Medical staff have difficulty deciding whether age or cognitive status should be the deciding factor ventilator allocation. Determination of a set policy would help professionals with these decisions.

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Introduction

Due to globalization, international travel and the extended use of antibiotics, the magnitude of the COVID-19 crisis is unprecedented and has resulted in a steep global economic recession.[1] With a total of over 92 million cases and close to 2 million reported deaths in 219 countries,[2] the COVID-19 pandemic has had devastating effects on public health in general and on the wellbeing of health care workers.

Indeed, professionals working in hospitals are among the most affected populations of the current pandemic. Several papers published during the last months have demonstrated that the increased workload and stress, together with the fear of contagion and physical exhaustion are associated with severe physical and psychological consequences among physicians, nurses and para-professionals.[3] Making decisions regarding the allocation of scarce resources to an increasing number of hospitalized COVID-19 patients, adds distress to these professionals' daily experiences.

Healthcare systems and health care workers have been confronted with decisions about triaging and priority-setting since Napoleonic times.[4] This decision-making process leads to numerous ethical dilemmas.[5,6] An ethical dilemma is defined as a situation in which professionals may be forced to act contrary to their professional values, or one in which they must choose between several

options that are equally "desirable" or "undesirable".[7] Studies show that professionals use their moral reasoning to deal with these dilemmas,[6,7] emphasizing the need to develop clear tools and strategies that can assist health care workers in resolving these dilemmas satisfactorily.[7,8] This need increases particularly when health care workers are faced with rationing dilemmas during disasters.[9]

Indeed, triaging during the COVID-19 pandemic has been described as the "toughest one"[10] because of the considerable scarcity of resources, and the need for allocation decisions on the basis of ethical principles that guide triage. These principles include autonomy (i.e., every person's right for self-determination); beneficence (i.e., that healthcare professionals must promote the health of the patients and give the best care possible); and justice (i.e., the principle of non-discrimination on the basis of age, gender, religion, etc.).[11]

The potential professional and ethical challenges facing hospital professionals increase when allocating scarce life-saving resources such as ventilators to older people in general and particularly to those with cognitive deterioration.[12] Although ageism - defined as age discrimination, has been widely discussed as a factor in the decision of allocating scarce medical resources, it has attained increased attention during the current pandemic. This is because, it has been clearly established that older people, and especially those with underlying chronic conditions such as diabetes and hypertension, are at a higher risk of developing COVID-19, as well as being at a much higher risk for mortality.[13] These risk levels may be even higher for people with Alzheimer's disease (AD), because of their typically high levels of comorbidities,[14] and because of their difficulties in understanding

and following recommendations for preventing the spread of the virus, such as handwashing, masking, and social distancing.[15]

Anxiety is a known characteristic in people suffering from AD, even prior to COVID 19. With the forced isolation brought on by the pandemic, loneliness, boredom and inactivity have increased. These are all causes of anxiety, which negatively affects quality of life and functional dependence, and stress of a family member who is a primary caregiver.[16]

Furthermore, social isolation among older adults is a serious public health concern because it increases risk of cardiovascular, autoimmune, neuro cognitive, and mental health illness,[17] which in turn may increase the risk of COVID 19 morbidity[18] among caregivers and patients with AD.

Still, organizations representing and promoting the welfare of people living with AD, state that the principles and values in the allocation of scarce resources should be followed in such a way that prevents discrimination on the basis of age or the diagnosis of AD.[19,20] Hospital healthcare professionals need to make these decisions.

The first aim of the present study was to assess the preferences of professionals working at a public hospital for allocating ventilators to people with and without AD, differentiating between a young and an elderly person with the disease, and another elderly patient with no cognitive decline. Based on the discourse about increased ageism during the COVID-19 pandemic,[21−25] and even the suggestion that adopting age as a criterion for rationing purposes is a moral decision,[26] we hypothesized that healthcare professionals would prefer to allocate a ventilator *first* to the 55-year-old person with an AD diagnosis, then to an elderly patient without AD and *last* to the 80-year-old person with an AD diagnosis. Our second aim was to examine the factors associated with these preferences. Based on previous studies about laypersons' views on priority setting for people with AD,[27,28] we examined associations between participants' preferences and (a) participants' sociodemographic and professional characteristics, (b) moral justifications, (b) overall beliefs about AD, and (c) beliefs about COVID-19. However, given the novelty of this study -conducted among hospital staff members, no specific hypotheses were postulated for the relationship between the dependent variable and its correlates.

Methods

Sample

The study population included members of the medical staff working at one general hospital in northern Israel. The criteria for inclusion in the study were: members of the medical staff (physicians, nurses, and para-professionals) who work in the various departments of the hospital, and who have more than six months of professional experience. The criterion for exclusion was: lack of command of the Hebrew language.

Overall, 278 professionals participated in the study (response rate 28%). The majority of the participants were female (61.4%) and married (75.1%). Regarding their professional characteristics, 72.9% were nurses, 21.6% physicians, and the remainder para-professionals. The participants reported having an average of 12.9 (SD = 10.8, range 1−40) years of professional experience, and an average of 5.6 (SD = 7.9, range 0−33) years of experience working with people with dementia.

Measures

We used a structured questionnaire that included the following measures:

Dependent variable

Preferences for allocating ventilators: Participants were presented with the description of three fictional male COVID-19 patients varying in their age and cognitive status. Moses was a 55-year-old man

with a diagnosis of AD, Jacob was an 80-year-old man with a diagnosis of AD, and Samuel was an 80-year-old man with no cognitive decline. Our rationale for comparing a younger and older person with AD was that a previous study had shown that laypersons' attitudes differed based on the age of the person with AD.[29] All patients were presented as being married and having three children, living at their homes with their spouses, and having a diagnosis of diabetes and high blood pressure. Participants were randomly presented with a query asking them which of the three fictional patients should in their opinion be allocated a ventilator first/last. Once a response was given, participants were asked which of the remaining two patients should then be allocated a ventilator first/last.

Independent variables

Sociodemographic characteristics: These included gender, age, education (fewer than 17 years of education, which would indicate nurses and para-professionals, or 17+ years of education, which would indicate physicians), marital status (single or widowed vs. married), and religiosity (secular vs. religious).

Moral reasoning: Participants were asked to report the importance they attributed to 10 items reflecting principles and rationales for priority setting.[30] Each item was rated on a Likert-type scale ranging from 1 (not at all important) to 5 (very important). An example item is "Everyone deserves the same chance of rescue from threatening circumstances". An overall index was calculated by averaging the items. The index showed good internal reliability (Cronbach's alpha = 0.73).

AD variables: As in previous research,[31] these variables included susceptibility to and fear of becoming ill with AD, as well as subjective knowledge, and familiarity with AD.

1. *Susceptibility to developing AD*: Participants were asked to report their perceived risk of developing AD during their lifetime, using one item rated on a 5-point Likert-type scale, ranging from 1 (no risk at all) to 5 (very high risk).
2. *Fear of developing AD*: Participants were asked to report their perceived fear of developing AD during their lifetime, using one item rated on a 5-point Likert-type scale, ranging from 1 (no fear at all) to 5 (very great fear).
3. *Subjective knowledge about AD*: Was assessed with a single question: "How much do you know about AD?" Answers were rated on a 5-point Likert-type scale, ranging from 1 (not much at all) to 5 (very much).
4. *Familiarity with an AD patient*: This variable was assessed by asking the participants whether they know someone with the disease.

COVID-19 variables: These included susceptibility to and fear of contracting COVID-19.

1. *Susceptibility to contracting COVID-19*: Participants were asked to report their perceived risk of contracting COVID-19 using one item rated on a 5-point Likert-type scale, ranging from 1 (no risk at all) to 5 (very high risk).
2. *Fear about contracting COVID-19*: Participants were asked to report their perceived fear about contracting COVID-19 using one item rated on a 5-point Likert-type scale, ranging from 1 (no fear at all) to 5 (very great fear).

Procedure

A cross-sectional study was conducted in a convenience sample of medical staff members working at one hospital in northern Israel in various departments (such as: internal, surgical, and emergency). Based on a confidence level of 95%, a population size of 1000, and a margin error

of 5%, the sample size needed was 270 (Qualtrics, 2020). One of the researchers – who works at the same hospital- met with potential participants and explained to them the importance of the research, its goals and the expected contribution of its results. The participants completed a structured and anonymous self-reporting questionnaire. The protocol of the study was approved by the Ethics Committee of the University of Haifa which also decided that informed consent forms were unnecessary. The study was conducted during August 2020.

Statistical analysis

The data were cleaned, coded, and analyzed using SPSS version 25.0. Descriptive statistics (percentages, means, and standard deviations) were used to describe the sample and the main variables. Bivariate associations between the dependent and the independent variables were examined using chi square analyses. For these analyses, continuous variables were dichotomized at the median.

Results

Preferences for allocating a ventilator: As seen in Fig. 1, participants' preferences for which COVID-19 patient should be allocated a ventilator *last*, were very clear. As hypothesized, the vast majority (75%) of the participants chose the 80-year-old person with AD to be the last to receive this treatment. With only 12% of the participants selecting the 80-year-old person, we can determine that the preferences were very clear also for which patient should not be allocated first. After this determination, the preference for allocation of a ventilator *first and last* between the two remaining patients were equally divided

between the 55-year-old patient with AD and the 80-year-old patient who was cognitively intact.

Correlates of preferences for allocating a ventilator: Given the results above, we only assessed the correlates for the preferences for Moses and Samuel. Only education, profession and fear of contracting the virus were associated with participants' preferences for which COVID-19 patient should be allocated a ventilator *first*. As can be seen in Table 1, the majority of the participants with lower levels of education (65%) chose a ventilator to be allocated *first* to the 50-year-old patient with AD, while 51% of those with higher levels of education preferred the 80-year old cognitively intact person to be the *first*. Regarding profession, 58% of the physicians preferred the older, cognitively intact person to be the first to be allocated a ventilator, while the majority of the other professionals (60%) selected the younger person with AD. Finally, healthcare professionals with higher levels of fear of contracting COVID-19 preferred the younger person with AD to be the first allocated to a ventilator. None of the correlates examined were significantly associated with the preferences for allocating a patient last.

Discussion

How to fairly allocate scarce resources, such as ventilators, during the COVID-19 crisis is a question causing anguish in public health systems worldwide but also for a huge number of healthcare workers as individuals and professionals. The aim of this study was to examine the preferences of professionals, should they be confronted with the decision to allocate a ventilator to a patient with or without a diagnosis of AD, and what factors are associated with their preferences.

The preferences of healthcare professionals working in a hospital were very clear concerning the 80-year-old person with AD: three
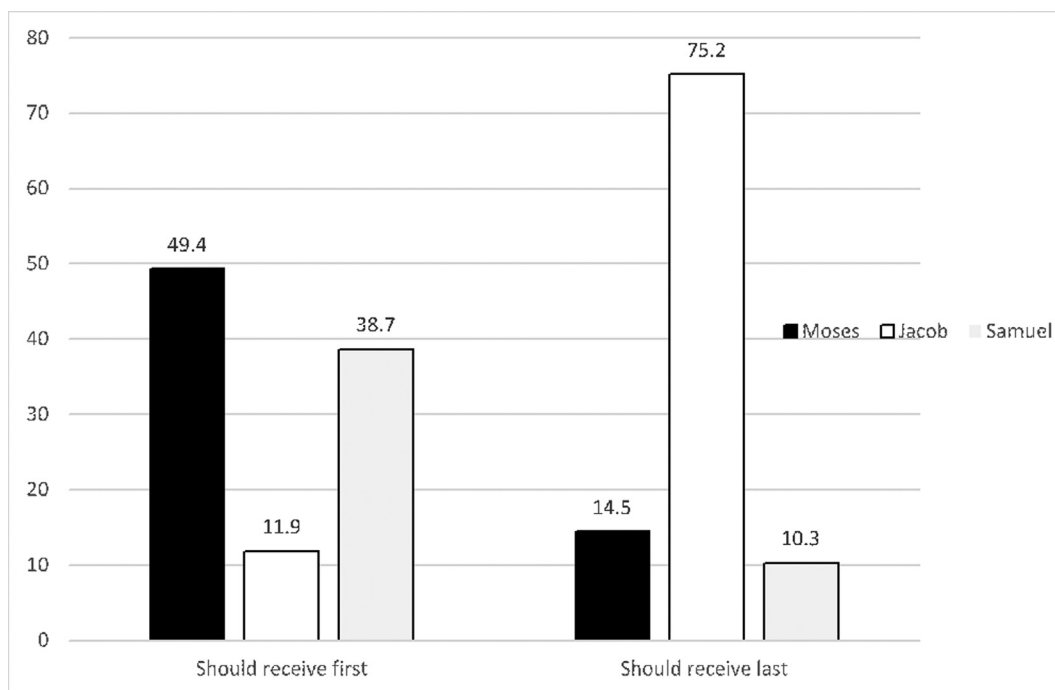
Moses – 55 years old with a diagnosis of AD

Jacob – 80 years old with a diagnosis of AD

Samuel – 80 years old, cognitively intact

Fig. 1. Preferences for allocating a ventilator (%).

Table 1
Correlates of preferences for allocating a ventilator first (%).

Correlates	Moses	Samuel
Sociodemographic characteristics		
Gender		
Male	55.1	44.9
Female	56.7	43.3
Education*		
Less than 17 years	64.8	35.2
17+ years	48.8	51.2
Marital status		
Married	59.5	40.5
Single	44.8	55.2
Profession*		
Physician	42.3	57.7
Other[1]	59.9	40.1
Professional experience		
< 10 years	56.7	43.3
≥ 10 years	56.6	43.4
Working with people with dementia		
< 2 years	54.3	45.7
≥2 years	57.9	42.1
Morality justification		
Low	58.6	41.1
High	52.9	47.1
AD variables		
Susceptibility		
Low	58.9	41.1
Medium+High	54.1	45.9
Fear of getting AD		
Low	53.8	46.3
Medium+High	56.3	43.7
Subjective knowledge		
Low+Medium	57.7	42.3
High	55.1	44.9
Familiarity		
No	58.5	41.5
Yes	53.6	46.4
Social distancing		
Low	57.9	42.1
High	54.0	46.0
Negative emotions		
Low	55.3	44.7
High	57.3	42.7
Positive emotions		
Low	50.5	49.5
High	59.4	40.6
COVID-19 variables		
Susceptibility		
Low	35.0	65.0
Medium+High	57.0	43.0
Fear of becoming ill*		
Low	47.7	52.3
Medium+High	61.0	39.0

Moses − 55 years old with a diagnosis of AD; Samuel − 80 years old, cognitively intact.
*p < .05.
[1] Nurses, occupational therapists, physiotherapists, paramedic.

quarters of the participants reported that he should be *last* for ventilator allocation, and only one out of eight or nine professionals thought he should be *first*. These findings suggest that when age and cognitive deterioration are presented simultaneously, and especially in a context of crisis and scarce resources, healthcare professionals consider this patient to be the one of least likely to benefit from the allocation of a ventilator.

Prioritization decisions seem to be, according to our results, more challenging when the combination of age and cognitive functioning characteristics differed. Indeed, the percentage of respondents giving preference to a 50-year old person with AD or a cognitively intact 80-year old person, was almost identical when asked who should be allocated *last* or *first*. This finding is of great importance for several reasons.

First, as suggested by the scientific literature as well as by policy-makers' recommendations[32,33] healthcare professionals seem to base their decisions on the values of fairness and respect regardless of the age and the type of impairment. Second, it seems that the participants in our study were unable to discriminate between the chances for survivability of an older person who was cognitively intact and a young person with cognitive deterioration. This is not surprising as clinicians' difficulties to estimate survival time in people with dementia is well recognized in the literature.[34] Finally, the preferences of healthcare professionals in hospitals were found to be almost identical to those reported in a recent study in which the general public was questioned,[28] suggesting that clinicians' decisions will be easily understood and supported by laypersons. This might not only reduce the distress of hospital professionals when making difficult decisions, but also might encourage adopting a more transparent and accountable triaging process.

In sum, our results show clearly that medical staff in general hospitals approach difficult and complex decisions, such as allocating life saving devices, with caution and integrity, carefully evaluating the characteristics of each patient.

Only a few of the list of correlates we examined were found to be significantly associated with participants' preferences for which COVID-19 patient should be allocated a ventilator first, and none with the preferences for which patient should be last. Indeed, only years of education, profession, and fear of contracting COVID-19, were significant correlates. While surprising at first, a closer examination of recent literature about priority-setting of scarce resources during the COVID-19 crisis shows that during times of disaster, healthcare professionals seem to rely less on ethical or moral principles, on patients' individualities, or on their own socio-professional characteristics, but more on factors associated with communal benefit.[35,36]

In an effort to help healthcare professionals with the complexities of making priority-setting life-and-death decisions during the current crisis, scoring systems such as the Sequential Organ Failure Assessment (SOFA) were developed.[37] Based on an assessment of major functioning systems (such as heart, lungs, kidneys, liver, and blood), patients with higher SOFA scores would be given a lower priority for ventilator allocation. However, the accuracy of such scoring systems in predicting survivability is debated, and it has been suggested that other factors should be considered when deciding to whom a ventilator should be allocated, and more importantly, who should be removed from such treatment.[38]

Limitations

This study had a number of limitations. First, we used a cross-sectional design, thus we are not able to draw causal conclusions. Second, we collected data from only one hospital, therefore limiting the study's generalizability. Third, our response rate was relatively low, although higher than other studies conducted with a similar population during the COVID-19 crisis.[39,40] Fourth, although we used structured validated measures, we nevertheless relied on self-reported data, which may have resulted in an increased social desirability bias. Fifth, we did not include a 55-year-old patient who had COVID-19 and was cognitively intact, therefore limiting our ability to better assess the impact of the age criterion. Sixth, our study examined priority-setting preferences only for allocating a ventilator. Making the decision to remove a patient from a ventilator might pose even greater dilemmas and stress. We did not examine the preferences of nursing and medical staff specializing in intensive care. These are usually the most important people in the care of patients in need of resuscitation. We suggest future studies to use a larger and more representative sample, as well as different strategies (such as face-to-face interviews), to overcome some of these limitations. Such studies should also focus on examining the medical staff's preferences regarding the allocation of additional life-saving resources (e.g. COVID-19 vaccine). Finally, given the few statistically significant correlates found in this study, we suggest investigating

other factors such as ageistic beliefs. This might be an important contribution, especially since positive findings are revealed medical staff members in hospitals could be exposed to the main principles of the Reframing Aging initiative.[41]

Conclusions and implications for policy and practice

Undoubtedly, hospital clinical staff members are exposed to tremendous mental and physical burdens during the COVID-19 outbreak. Dealing with triaging questions such as 'should a person with AD have an equal chance as a cognitively intact person to be allocated a ventilator?' 'should the age of the person make a difference?', adds stress and anxiety, especially at times when life-saving resources are scarce.

Indeed, findings of this study indicate that despite their personal and professional characteristics hospital staff members have difficulty deciding whether age or cognitive status should be the factor for deciding which COVID-19 patient should be allocated a ventilator. We believe several policy and practical steps might help professionals with these decisions.

First, clear triaging protocols should be developed to assure that all ethical principles are considered (even if not finally implemented), especially for patients with AD or other type of dementia.[38] These protocols should include objective measures to assess survivability. Second, to ease the moral and clinical difficulties of triaging in general and especially for persons with AD, we suggest decisions should be made by a team or a committee.[11] Third, given the heterogeneity of dementia, clinical staff members should be encouraged to assess the individual characteristics of each patient before reaching a decision. This includes respecting their autonomy by inquiring (directly or through their next-of-kin) about their wishes and preferences. Fourth, hospital administrators should provide clinical staff with the knowledge and the support to make difficult decisions involving persons with AD and their family members.

Establishing workshops for the nursing and medical staff in hospitals as well as in nursing and medical schools, to raise knowledge and awareness about AD and its stages.

Healthcare workers dealing with AD are exposed to stress due to the suffering and death of COVID-19 patients. This also requires that the management of the organization arrange psychological counseling in an effort to avoid post-trauma symptoms.

Declaration of Competing Interest

None.

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