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Healthcare Disparities in Critical Illness

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Abstract

Objective—To summarize the current literature on racial and gender disparities in critical care and the mechanisms underlying these disparities in the course of acute critical illness.

Data Sources—MEDLINE search on the published literature addressing racial, ethnic, or gender disparities in acute critical illness such as sepsis, acute lung injury, pneumonia, venous thromboembolism, and cardiac arrest.

Study Selection—Clinical studies that evaluated general critically ill patient populations in the United States as well as specific critical care conditions were reviewed with a focus on studies evaluating factors and contributors to health disparities.

Data Extraction—Study findings are presented according to their association with the incidence, clinical presentation, management, and outcomes in acute critical illness.

Data Synthesis—This review presents potential contributors for racial and gender disparities related to genetic susceptibility, comorbidities, preventive health services, socioeconomic factors, cultural differences, and access to care. The data is organized along the course of acute critical illness.

Conclusions—The literature to date shows that disparities in critical care are most likely multifactorial involving individual, community, and hospital-level factors at several points in the continuum of acute critical illness. The data presented identify potential targets as interventions to reduce disparities in critical care and future avenues for research.

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Supplemental Digital Content

The supplemental material includes 4 separate tables describing results from studies that have evaluated disparities in the incidence, clinical presentation, management and outcomes from acute critical illness.

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Keywords

health disparities; critical illness; organ dysfunction; outcomes

Introduction

There are racial, gender, and socioeconomic disparities in the most common causes of morbidity and mortality in the US ⁽¹⁾. Racial and ethnic minorities seem less likely to receive appropriate medical care in the hospital ward and intensive care unit (ICU) ^{(2) (3) (4)}. Since racial and ethnic identity is a measure of the social and historical heritage from a particular country, this review will focus on US-based disparities in health. Eliminating health disparities is the top priority of multiple regulatory bodies and initiatives in the US (e.g., the National Institutes of Health ⁽⁵⁾, the Institute of Medicine (IOM), the Patient Protection Affordable Care Act ⁽⁶⁾). The Committee on Comparative Effectiveness Research has declared racial and ethnic disparities in healthcare delivery to be one of the nation's top research priorities ⁽⁷⁾. In this review, the term 'health disparity' is used, as per the IOM report, to describe any differences in health status, health outcomes, and healthcare use that reflect a gap in the quality of care delivered and may be caused by societal inequities (e.g., differential socioeconomic status (SES)) and patient, provider, or system-level factors that result in differential treatment ⁽²⁾.

A body of literature shows that health disparities indeed exist in our critically ill patients ^{(8) (9)}. To date, most of this literature is descriptive without interventional studies to reduce health disparities in these patients. Therefore, the purpose of this review is to summarize the current state of the critical care literature on the possible contributors underlying health disparities, where they exist in the course of acute critical illness, and identify potential targets for intervention (Figure 1).

Health Disparities in the course of Acute Critical Illnesses

Critical illness is unique in the acuity of its presentation and the compressed time frame for disease development and course. Nevertheless, health disparities are documented during the entire course of acute critical illness from the individual susceptibility to acute illness in the community, to the clinical presentation and medical management in the hospital, and subsequent outcomes (Figure 1). Since the factors involved in health disparities differ depending on where these disparities occur along the course of acute critical illness, a clear understanding of where these disparities exist is pivotal to devising future interventions to improve outcomes for all patients regardless of gender, race, and SES.

Traditionally, race was defined as a biological construct affected by genetic makeup and ancestry ⁽¹⁰⁾. Race is now recognized to be a social construct and a marker for social class, culture, environmental differences or as proxy for SES ^(10, 11). Even though self-report is considered the optimal method for collecting racial data ⁽¹⁰⁾, research studies have assigned race based on skin color, direct observation, proxy report or extraction from medical records. Furthermore, race and ethnicity are often coded differently in state vital statistics, medical records, or the US Census ⁽¹²⁾. For this review, we will report race as defined by each study but will specify how race was defined to facilitate interpretation by the readers (Tables 1-4).

Disparities in the incidence of acute critical illness (supplemental digital content, Table 1)

Men and African Americans have a higher incidence of conditions that require ICU-level of care. Males have a higher incidence of sepsis ^{(13) (14) (15)} and noncardiogenic acute

respiratory failure^{(16) (17)}. Further data is needed to determine whether gender is an independent risk factor for venous thromboembolism (VTE) as studies show either higher rates of first VTE in women⁽¹⁸⁾, men⁽¹⁹⁾, or no differences at all^{(20) (21)}. However, when looking at particular age groups, there seems to be a higher risk of VTE among women of childbearing age^{(20) (19)} and elderly males^{(21) (22) (23)}. Males also seem to have higher rates of recurrence^{(24) (25)} but not all studies support these findings⁽²⁶⁾.

The racial and gender differences in sepsis are documented in multiple observational and randomized controlled trials^{(27) (14) (28) (29) (30)}. African Americans and other non-whites have a higher incidence of sepsis compared to whites^{(31) (13)}. Even after adjusting for differences in poverty and region of residence, African American race remains independently associated with higher incidence of sepsis⁽³¹⁾. African Americans also have higher age-adjusted rates of cardiac arrest in or out of the hospital^{(32) (33) (34)}, acute lung injury (ALI)⁽³⁵⁾, noncardiogenic acute respiratory failure⁽¹⁶⁾, and VTE^{(17) (36) (18)}. It is unlikely that the different rates of VTE are due to diagnostic or ascertainment bias since nationwide data show no differences in use of ventilation-perfusion lung scans, venous ultrasonography, or contrast venography by race or gender^{(37) (38)}.

Contributors to disparities in incidence

Genetic Susceptibility

Differences in hormonal milieu and healthcare access do not fully explain the racial or gender disparities in sepsis^{(14, 39) (40)}. Genetic variations may alter the host immunological response and modulate the risk for infection and acute critical illness^{(41) (42) (43) (44) (45)}. Several variants of genes involved in inflammatory and innate responses to infection show different allelic frequencies by race and gender in ALI and sepsis, suggesting that race and gender may have variable inherent response to infection. For instance, polymorphisms in *lipopolysaccharide binding protein* and *tumor-necrosis factor B* are associated with higher risk of sepsis in males^{(46) (47) (48) (49)}. Allelic variants in *myosin light chain kinase* confer higher risk of sepsis and ALI in African Americans^{(50) (51)}.

However, genetic epidemiological studies in critical illness have been limited by including mostly white patients, small sample size, misclassification of syndromal phenotypes like sepsis and ALI, variable methods for adjustment of population admixture, and difficulty in defining race genetically^{(52) (53) (54) (55) (56)}.

Genetic susceptibility alone does not fully explain the differences in prevalence of common acute critical illness. For instance, African Americans do not carry the most common mutations associated with higher risk of VTE^{(36) (57) (58)}. However, since genetic conditions account only for a small proportion of VTE in general, it is likely that other unknown genetic markers might be more prevalent among African Americans and account for these racial differences.

Chronic Comorbid Conditions

Racial differences in comorbid conditions prior to hospital admission may increase the susceptibility to acute critical illness^{(13) (31) (14) (40)}. African Americans have higher rates of comorbidities that increase the risk of acute respiratory failure such as sepsis and acute renal failure^{(13) (31)}. Non-white patients have more comorbidities that alter immune function (e.g., HIV, alcohol abuse, chronic renal failure, and diabetes mellitus)^{(40) (59)} and higher rates of acute organ dysfunction and progression to severe sepsis⁽⁴⁰⁾. Consistently, studies show that African American septic patients are not only younger but more likely to have diabetes, chronic renal failure, obesity, and HIV. Remarkably, 12% of African Americans with sepsis had HIV compared to only 0.7% of whites⁽⁵⁹⁾.

African Americans also have higher rates of comorbidities that increase the risk of VTE such as obesity, hypertension, diabetes, and kidney disease while surgery, trauma, and infections are more prevalent in whites ^{(36) (58)}.

Socioeconomic Status, Health Behaviors, and Access to Care

Considerable evidence indicates that health status, services, and mortality differ by SES, race, and ethnicity in the US ^{(60) (61)}. A lower SES and minority race are associated with poor health ⁽⁶²⁾, lower rates of health insurance, less access to preventive health services and primary care ⁽⁶³⁾. SES is a confounder of racial differences in health and part of the causal pathway by which race affects health ⁽⁶⁴⁾. However, many studies on health disparities fail to adjust for SES partly because SES data is not reported or routinely collected in the US ^{(65) (66)}. Additionally, different SES indicators capture varying aspects of health risk and may be inaccurate ^{(10) (67)}. For instance, the use of aggregate geographic measures such as zip codes or census tract do not reflect the impact of individual- and household-level factors on health outcomes ^{(68) (69)}.

Differences in SES and environmental factors such as education, poverty, and segregation contribute significantly to poor health habits and lack of care of comorbid conditions in patients from the minority groups that places them at higher risk for acute critical illness and poor health status prior to hospital admission ⁽⁷⁰⁾. Minorities with lower SES and those who live in areas with higher rates of poverty have higher incidence of acute critical illness ^{(71) (72)} and severe sepsis ⁽³¹⁾.

Racism is a known cause of health disparities outside of critical care and a possible, but less studied, contributor to disparities in acute critical illness ^{(73) (74)}. Racial bias leads to disparities in healthcare through residential racial segregation ⁽⁷⁵⁾ that adversely affects health by limiting education, employment, quality of life, healthy lifestyles, access to medical care, and increasing exposure to environmental toxins and stressors ^{(76) (74)}. However, precise measures of racial discrimination are not available and most studies are based on surveys and respondent-perceived attitudes and behaviors.

Disparities in clinical presentation (supplemental digital content, Table 2)—

African American males develop sepsis at a younger age and are more likely to require ICU admission ^{(13) (15)}. Males are more likely to have pulmonary infections which represent 40% of sepsis cases while females are more likely to develop sepsis from genitourinary sources which only account for 10% of cases ^{(14) (27) (40)}. In addition, even after controlling for the source of infection, males are more likely to have sepsis from Gram-positive organisms ⁽⁴⁰⁾. Similarly, African Americans are more likely to have Gram-positive infections independent of the infection source ⁽²⁴⁾ and higher proportion of invasive pneumococcal disease in adults < 65 years compared to whites ⁽⁷⁷⁾. This has significant clinical repercussions since Gram-positive infections are less responsive to therapy and lead to more severe illness ⁽⁷⁸⁾ and higher rates of acute organ failure ^{(40) (79) (80)}. In the study by Mayr ⁽⁷⁷⁾, African Americans had higher infection-related hospitalization rates and increased risk of developing acute organ dysfunction (e.g., acute renal failure, acute respiratory failure). The study by Esper also showed that African American and other race patients were more likely to develop at least 1 acute organ dysfunction in sepsis (severe sepsis) when compared with whites (35% vs. 37% vs. 29%, $p < 0.01$) ⁽⁴⁰⁾.

African Americans do not only present with acute critical illness at a younger age but they also have more physiological derangements and a higher severity of illness on admission to the hospital and the ICU ^{(81) (82) (31) (83) (84)}. Furthermore, they also have cardiac arrests at a younger age with longer time for return of spontaneous circulation, less shockable rhythms,

delayed defibrillation, and less bystander-initiated cardiopulmonary resuscitation (CPR) ^{(85) (86) (87)}.

Contributors to disparities in clinical presentation

Access to Care and Preventive Health Services

The higher rates of invasive pneumococcal disease in African Americans are most likely due to their lower rates of pneumococcal vaccination ^{(88) (77)}. Indeed, among patients hospitalized with community-acquired pneumonia (CAP), prior pneumococcal vaccination is associated with increased survival, decreased risk of respiratory failure, decreased length-of-stay (LOS), and ICU admission ^{(89) (90)}. The poor often do not have health insurance and this may contribute to a greater burden of comorbidities, delays in seeking medical care and diagnosing at-risk conditions for critical illness, a higher severity of illness and a higher risk of acute organ failure on hospital presentation ⁽⁸¹⁾.

Chronic Comorbid Conditions

Several chronic medical conditions differ by race prior to the time of in-hospital cardiac arrest ⁽⁸⁵⁾. Compared to whites, African Americans are sicker at the time of the arrest and have higher rates of renal insufficiency and hemodialysis, diabetes mellitus, baseline central nervous system depression, stroke, pneumonia, sepsis, and major trauma.

Alcohol abuse plays an important role in acute critical illness. Alcohol-use disorder is more common among African Americans, Hispanics and Native American critically ill patients ⁽⁹¹⁾. Critically ill patients with alcohol-use disorder have higher severity of illness, rates of sepsis, ALI, organ dysfunction, pneumonia and postoperative complications ^{(92) (93, 94) (95) (96) (97)}. However, evidence attributing the racial disparities in acute critical illness to drug- or alcohol-related disorders is currently unavailable.

Disparities in clinical management (supplemental digital content, Table 3)—

The care delivered to critically ill African American patients may differ from care delivered to white patients before, during, and after the ICU stay ⁽⁸¹⁾. Compared to whites with the same diagnosis, non-whites are admitted to the ICU less often even after controlling for hospital and insurance plans ^{(3) (98)}. African Americans are less likely to be admitted to cardiac care units ⁽⁹⁹⁾, wait longer to be admitted to an ICU from the emergency room (ER) ⁽¹⁰⁰⁾, and are less likely to receive interventions such as dialysis, tracheostomy, central venous access, and pulmonary artery catheterization even after adjusting for severity of illness ^{(101) (81)}. Non-whites with sepsis and mechanically ventilated African American patients are less likely to be discharged to another medical facility after an ICU stay ^{(13) (40)} or to long-term acute care hospitals ⁽¹⁰²⁾.

While this is certainly concerning for treatment bias, it is also important to note that differential treatment may reflect differences in the incidence of critical illness, the clinical need, or personal preferences for medical care. For example, while minorities tend to present with greater severity of illness, they may also be younger and have better recovery of organ failures. We need additional studies that examine the racial and gender utilization of critical care interventions that account for variable incidence of critical illness, clinical indication, access, and personal preferences to assess this potential contributor to racial disparities in critical care.

Contributors to disparities in clinical management

Healthcare Delivery and Processes of Care

A significant component of the racial differences in delivery of care can be attributed to the type of institutions that predominantly serves minority patients. Hospitals caring for greater number of African American patients are more likely to be urban and nonprofit and to care for patients on Medicaid ⁽¹⁰³⁾. These ‘safety net’ hospitals have more financial constraints that limit quality improvement initiatives and lack the infrastructure for the delivery of high-quality of care ⁽¹⁰⁴⁾. This is clearly documented in the treatment of CAP ⁽⁸⁴⁾ ⁽¹⁰⁵⁾. Mayr showed that African Americans with CAP are less likely to receive guideline-concordant antibiotics within a 4 hour window than whites but these racial differences were due to differences in healthcare delivery across hospitals but not within the same institution ⁽⁸⁴⁾. In contrast, at institutions like the VA system with equal access to care, African American and whites patients with CAP were equally likely to receive guideline-concordant antibiotics either in the medical wards or the ICU ⁽¹⁰⁶⁾. In a study by Pines, African American patients waited longer in the ER for an ICU bed than other patients in the same hospital; indicating within-hospital racial differences. However, for non-ICU patients, the difference in ER LOS was explained by between-hospital differences: hospitals with a higher proportion of ER visits by African Americans had longer ER stays than hospitals with lower number of ER visits by African Americans. Overall, the data to date indicate that institutional differences in where minorities seek medical care contribute to the quality gap in healthcare ⁽¹⁰⁷⁾ ⁽¹⁰⁸⁾.

Socioeconomic Status and Access to Care

The poor often do not have health insurance and have less access to costly care or procedures during hospitalization. This is of great concern since African American septic patients are four times more likely to be uninsured than whites ⁽⁵⁹⁾. Self-pay patients receive the lowest intensity of care such as radiographic and surgical procedures, consultations, and ICU care ⁽³⁾. Indeed, the availability of medical insurance is a determinant of intensity of critical care services in critically ill patients ⁽¹⁰⁹⁾. A recent US study showed that within the same hospital, uninsured critically ill patients had less use of common critical care procedures compared to those with health insurance even after adjusting for severity of illness ⁽¹¹⁰⁾. Race and medical insurance status may also affect post-ICU care and long-term acute care utilization ⁽⁴⁰⁾ ⁽¹⁰²⁾. However, it is not yet clear whether these differences in access to long-term acute care contribute to disparities in long-term outcomes.

Differences in Preferences for Care

The ICU is a common site for the delivery of end-of-life care ⁽¹¹¹⁾. African Americans and Hispanics prefer more intensive level of care at the end-of-life ⁽¹¹²⁾ ⁽¹¹³⁾ ⁽¹¹⁴⁾. They are less likely to discontinue mechanical ventilation ⁽¹¹⁵⁾, have advance directives and do-not-resuscitate orders, or pursue palliation ⁽¹¹⁶⁾ ⁽¹¹⁷⁾ ⁽¹¹⁸⁾. The preferences for end-of-life care are influenced by the race, ethnicity, and cultural beliefs of the patient or surrogate ⁽¹¹⁹⁾ ⁽¹²⁰⁾. African American patients and their surrogates have more optimistic views about critical illness, prognosis, and treatment efficacy that are associated with more aggressive care at the end-of-life ⁽¹²¹⁾ ⁽¹²²⁾ ⁽¹²³⁾. Survival is minimally prolonged even with a higher intensity of care at the end-of-life ⁽¹¹²⁾. The discrepancy between increased preferences for aggressive care at the end-of-life in certain racial populations without improved outcomes raises the question of whether there might be physician and patient miscommunication about therapeutic options and benefits at the end-of-life. Indeed, a study by Muni suggests that race and ethnicity may contribute to discordance between physicians’ communication with patients and surrogates ⁽¹²⁰⁾.

Disparities in outcomes from acute critical illness (supplemental digital content, Table 4)

Mortality: Due to differences in study design, patient population, and case mix, the data on the influence of gender and race on the outcomes of critical illness has yielded conflicting results. Overall, males and African Americans have higher mortality from sepsis⁽¹³⁾ (14, 124) (59) and ALI⁽⁸³⁾ (125). African Americans have higher age-adjusted mortality rates from VTE⁽¹⁷⁾ (57) (126) (127), and lower rates of successful resuscitation from in-hospital and out-of-hospital cardiac arrest⁽³²⁾ (33) (34), less post-resuscitation survival⁽⁸⁵⁾ (86) (87), lower risk-adjusted rates of 1-year survival and higher readmission rates⁽¹²⁸⁾. Data from the ARDS Network and the trauma registries show that even though ARDS mortality is declining⁽¹²⁹⁾, Hispanic patients have higher mortality than whites after adjustment for severity of injury and comorbidities⁽¹³⁰⁾. There is inconclusive data on gender-based differences in mortality from VTE and further research is needed to address this question. While some studies show a higher mortality in men⁽¹⁷⁾, particularly among the elderly⁽¹³¹⁾, others show no gender differences at all⁽²³⁾ (57).

Even though there are gender and racial differences in mortality, there does not appear to be a disparity in the case-fatality rates in males and African Americans with sepsis⁽¹³⁾ (14, 124) (59), ALI⁽⁸³⁾, VTE⁽¹²⁷⁾, or acute respiratory failure⁽¹⁶⁾ except for recent data in trauma-related ALI showing increased case-fatality rates among Hispanic patients⁽¹³⁰⁾. The literature so far suggests that the likelihood of dying once critically ill septic patients are hospitalized does not differ by race or gender and it argues that perhaps the main contributors to disparities are chronic disease, outpatient care, and access to but not delivery of care. This is supported by the studies on CAP that show similar clinical outcomes even though there are differences in the quality of care for CAP⁽⁸⁴⁾ (105).

Most studies on racial disparities in critically illness have focused on African Americans and not on other ethnic or racial groups. A recent study by Cooke showed that even though both African American and other race patients had higher risk of acute respiratory failure, only patients from the other race group with at least 2 organ failures had higher case fatality rates compared to whites⁽¹⁶⁾. A study by Melamed reported significant sepsis-associated mortality in American Indians/Alaska natives, and Hispanics⁽¹³²⁾. It is unclear in this study whether the racial difference in sepsis-related mortality is due to different mortality in sepsis or different incidence of sepsis which carries a high mortality.

The interpretation of mortality data in critical care is hindered by several methodological issues. Even though minorities are admitted with more physiological derangements, not many studies adjusted for severity of illness in their outcome analysis. In a recent multicenter study by Erickson, African American patients had a higher hospital mortality than whites; however, after adjusting for severity of illness, there were no differences in mortality or ICU LOS⁽⁸²⁾. This is consistent with epidemiological data in sepsis⁽¹³⁾, ALI⁽⁸³⁾, and general ICU populations⁽⁵²⁾ that showed no difference in severity-adjusted hospital mortality between African Americans and whites.

Another problem is overestimation of mortality rates from census undercount⁽¹¹⁾. US Census data is commonly used to calculate the denominators for mortality rates but while the overall undercount for the US population is small, it is larger for African Americans, Hispanics, and reservation Indians. Understanding the racial, gender and age differences in mortality after critical illness is further hampered by the under-enrollment of minorities, women, and the elderly in critical care research. Even though recent pooled data from 3 ARDS Network studies indicated no differences in the likelihood of enrollment by race or ethnicity, men and patients 75 years of age were less likely to be enrolled due to medical

comorbidities⁽⁸³⁾⁽¹³³⁾. Lower consent rates of racial and ethnic minorities are also documented in trauma research⁽¹³⁴⁾.

Functional Outcomes: Relatively few studies have examined disparities in other outcomes related to critical care such as health-related quality-of-life, cognitive, psychological, and physical disability. The limited data indicate that minorities are at higher risk of poor functional outcomes. Compared to whites, African Americans and Hispanics have worse outcomes related to quality-of-life, emotional and neurobehavioral complications, less community integration, and are less likely to receive treatment and be employed after traumatic brain injury⁽¹³⁵⁾. Minority patients also have higher levels of post-traumatic stress disorder (PTSD) after trauma⁽¹³⁶⁾. The literature in this area is scant and it is unclear whether the PTSD can be attributed to greater severity of injury that is often reported in minority patients, or to events before and after hospitalization.

Contributors to disparities in outcomes

Genetic Susceptibility

Even though the genetic makeup does not seem to account for a large proportion of the racial and genetic differences in health, genetic markers may contribute to adverse outcomes. In sepsis, polymorphisms of *lipopolysaccharide binding protein* and *tumor-necrosis factor B* are associated with non-survivors and higher hospital mortality in males⁽⁴⁶⁾⁽⁴⁸⁾⁽⁴⁹⁾. Furthermore, a functional polymorphism of the *Duffy antigen/receptor* gene has been recently associated with worse clinical outcomes among African American patients with ALI⁽¹³⁷⁾.

Healthcare Delivery and Processes of Care

The racial disparities in survival for in-hospital cardiac arrest may be due to differences in care provided by the institutions in which African Americans receive medical care before, during, and after cardiac arrest⁽¹³⁸⁾. Prior to in-hospital cardiac arrest, African Americans are more likely to be admitted to an un-monitored bed, receive care in a hospital with > 500 beds, and to have delayed defibrillation (> 2 min)⁽⁸⁵⁾. The survival data in in-hospital cardiac arrest strongly supports that disparities in healthcare are due to African Americans receiving care in lower-quality hospitals with the lowest survival rates⁽³¹⁾⁽⁸⁴⁾⁽¹⁰³⁾⁽¹³⁹⁾. Other possible mechanisms such as racial differences in resuscitation-related variables (e.g., time to subsequent defibrillations, quality of chest compressions, number and timing of resuscitation medications) have been proposed and need further study⁽⁸⁵⁾.

In addition, the association of African American race with lower rates of long-term survival and higher re-admission rates⁽¹²⁸⁾ raises the possibility of differences in care after discharge. Further research is needed to determine whether there are racial differences in discharge destination, cardiac catheterization and implantation of cardioverter-defibrillator during the index hospitalization, or access to follow-up outpatient care.

Socioeconomic Status and Access to Care

Race and the availability of medical insurance are predictors of mortality in critically ill and trauma patients⁽¹⁰⁹⁾⁽¹⁴⁰⁾. Within the same hospital, uninsured critically ill patients have an increased 30-day mortality compared to those with health insurance even after adjusting for severity of illness⁽¹¹⁰⁾. In a retrospective study by O'Brien, the lack of health insurance remained associated with sepsis-associated mortality after stratifying the hospitals based on rates of sepsis-associated admission or mortality by age (18-64 y/o and 65 y/o)⁽¹⁴¹⁾. Sepsis-associated mortality was not explained by sociodemographic factors, comorbidities or hospital rates of sepsis-related admission or deaths.

The association between insurance status and worse mortality in critical illness does not necessarily imply treatment bias in hospital care of acute critical illness. Insurance status and access to care prior to or after hospital presentation may contribute more to short- and long-term mortality differences than treatment received in the hospital. For example, in VTE, Schneider found that whites were significantly more likely to be covered by Medicare ($p < 0.001$) and African Americans were more likely to be uninsured, self-pay, or have charity care ($p < 0.02$)⁽¹²⁷⁾. In addition, there was a higher incidence and mortality from VTE in African Americans. However, the in-hospital case fatality was similar between race groups, suggesting that the racial differences in mortality from VTE are independent of hospital care practices and that the disparity may occur prior to the index hospitalization for VTE.

Addressing Health Disparities in the ICU

The contributors to health disparities in acute critical illnesses are diverse including host differences in genetic predisposition and chronic conditions and variable delivery of care before, during, and after hospitalization for acute injury (Figures 1 and 2). SES is among one of the strongest determinants of disparities in health. Research on racial disparities in critical care should seek to understand how socioeconomic and environmental factors combine with clinical determinants to affect the distribution and outcomes of critical illness⁽¹⁴²⁾. Furthermore, we need public policies with a focus on community interventions to improve the health conditions and access to healthcare of minorities prior to the development of acute critical illness and the need for in-patient care.

No studies have yet addressed interventions to reduce racial and ethnic disparities in the ICU, but the literature to date identifies potential targets along the course of acute critical illness. The Affordable Care Act⁽⁶⁾ provides the opportunity to address some of the areas that affect health disparities (e.g., access to healthcare). Even though the genetic makeup cannot be altered, genetic susceptibility may allow for risk prognostication and identification of high risk individuals for preventive strategies. To decrease the susceptibility to critical illness and reduce disparities in disease prevention, presentation, management and outcomes, changes in healthcare policy should involve interventions at several levels.

Community-based interventions should address CPR training, increase immunization rates in African Americans, and management of chronic diseases. Of particular importance is to improve SES and environmental factors such as education, segregation, and poverty that directly affect health behaviors, lifestyles, and health status. **Regional-based interventions** to increase access to health insurance and medical care may improve the care of chronic pre-existing conditions, allow patients to seek medical care early on in their critical illness, and minimize differential access to post-acute care by minorities. **Hospital-based interventions** should focus on management of acute organ dysfunction and increase quality improvement strategies at institutions with limited resources. Standard admission criteria across long-term acute care hospitals may also improve access to post-acute care by minorities. Lastly, addressing preferences for care and palliation in patients at the end-of-life early on during the ICU admission may provide appropriate medical care and options to patients and families according to their cultural beliefs.

Conclusions

The disparities in acute critical illness are likely multifactorial and involve individual, community, and hospital-level factors at several points in the course of critical illness. An understanding of where and what type of disparities exist in critical care is vital prior to embarking on any intervention to reduce health disparities. The literature presented in this review identifies potential targets for interventions and future areas of research.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Figure 1. Healthcare Disparities along the Continuum of Acute Critical Illness

AA, African American; ALI, acute lung injury; CKD, chronic kidney disease; DM, diabetes mellitus; GU, genitourinary; HIV, human immunodeficiency virus; PAC, pulmonary artery catheterization; SES, socioeconomic status; VTE, venous thromboembolism

Figure 2. Factors related to Healthcare Disparities in Acute Critical Illness
SES, socioeconomic status