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Perspective

Combatting human trafficking in the United States: how can medical informatics help?

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ABSTRACT

Objective: Human trafficking is a global problem taking many forms, including sex and labor exploitation. Trafficking victims can be any age, although most trafficking begins when victims are adolescents. Many trafficking victims have contact with health-care providers across various health-care contexts, both for emergency and routine care.

Materials and Methods: We propose 4 specific areas where medical informatics can assist with combatting trafficking: screening, clinical decision support, community-facing tools, and analytics that are both descriptive and predictive. Efforts to implement health information technology interventions focused on trafficking must be carefully integrated into existing clinical work and connected to community resources to move beyond identification to provide assistance and to support trauma-informed care.

Results: We lay forth a research and implementation agenda to integrate human trafficking identification and intervention into routine clinical practice, supported by health information technology.

Conclusions: A sociotechnical systems approach is recommended to ensure interventions address the complex issues involved in assisting victims of human trafficking.

Key words: human trafficking, ethical issues, clinical decision support systems, data analytics, sociotechnical systems

INTRODUCTION

Trafficking of children and adults for commercial and sexual exploitation is a far-reaching global problem, made worse by refugee crises, military conflicts, and multiple other causes.[1] While this may seem like an issue that only affects certain parts of the world, trafficking is an important problem in the United States.[2] From 2007-2018, the National Human Trafficking Hotline identified over 50 000 human trafficking cases in the United States, including instances of sex and labor trafficking.[3] Although the majority of trafficking survivors identified in 2018

through the hotline were adults, trafficking frequently began when individuals were under 18.[3] Estimates vary widely of the scope of trafficking in both the United States and globally for many reasons, including a lack of common databases, terminology differences, and law enforcement data variability.[2,4,5]

The 3 core elements of human trafficking are action, means, and purpose. The United Nations defines trafficking in persons as:

> The recruitment, transportation, transfer, harbouring or receipt of persons, by means of the threat or use of force or other forms

of coercion, of abduction, of fraud, of deception, of the abuse of power or of a position of vulnerability or of the giving or receiving of payments or benefits to achieve the consent of a person having control over another person, for the purpose of exploitation.[6]

Exploitation can take various formats, including prostitution, pornography, slavery, forced labor, and removal of organs. Trafficking occurs on a domestic level, where citizens of a country are victimized within that country, or transnationally, where victims are transported across national boundaries for purposes of exploitation, including transport of victims from other countries into the United States.[6]

Responses to combat trafficking began with the establishment of international, national, and state laws defining trafficking as a crime.[7,8] Over the last 10 years, a potentially significant role for health-care providers to aid in combatting human trafficking has emerged. Many victims of trafficking seek health-care services, both to address routine health-care needs and to deal with trafficking-related trauma.[9–12] In a 2016 survey of survivors of trafficking, 68% of respondents indicated receiving health-care services from a variety of providers, with the largest categories being emergency/urgent, primary, dental, and obstetrics/gynecology care.[11] A 2014 report from the Institute of Medicine and the National Research Council on sex trafficking of minors reviewed the many barriers to identifying victims of trafficking in health-care settings and suggested opportunities for increased involvement of health providers in identifying and assisting victims.[2] Groups such as the American Academy of Pediatrics have developed guidelines to assist clinicians with identifying trafficking victims and create pathways for clinicians to assist victims.[13] Several educational resources about human trafficking have also been developed for health-care trainees and professionals.[14–17] There are multiple potential indicators that someone is being trafficked, but victims rarely self-identify and the lack of validated tools to assist health-care providers with victim identification hampers consistent screening across health-care contexts.[13] Despite existing efforts in health care, clinicians and health-care organizations remain ill equipped to identify victims and, if they have suspicions, to know what steps to take to provide meaningful assistance. This Perspectives article proposes that medical informatics can make substantial contributions in combatting human trafficking, and identifies definitive next steps specific to medical informatics research and implementation.

MATERIALS AND METHODS

Potential medical informatics contributions
Human trafficking is a multi-factorial problem, and medical informatics contributions to date have faced multiple barriers. Even the most fundamental step of identifying trafficking victims during health-care encounters has proven challenging. Recent reviews of screening tools for the identification of trafficking victims noted significant variability in content, limited tools for use specifically in health-care contexts, and a lack of validity and reliability assessments for the majority of tools.[18,19] The variability of population characteristics (eg, age, gender, exploitation type, English-language fluency, sociocultural components) introduces additional complexity.[20,21] Compounding the challenges of identification are the many barriers victims face to reporting that they are being trafficked, including stigma and threats of retaliation.[22,23] Despite these challenges, we propose 4 specific areas where medical informatics could contribute: (1) screening, (2) clinical decision support, (3) community-facing tools, and (4) analytics, both descriptive and predictive.

Screening
The identification of potential trafficking victims during health-care encounters is a fundamental gap, and consistently implemented, validated screening tools are urgently needed. Protocols to assist health-care providers with consistently and reliably screening for trafficking characteristics have proven beneficial in small-scale studies.[24] However, the identification of trafficking victims in health-care settings is currently done in a piecemeal fashion, depending on clinician awareness, clinician knowledge of trafficking indicators, and whether a health-care organization has a screening protocol in place.[25] Although trafficking awareness is increasing among clinicians thanks to educational efforts, putting that knowledge into practice is an area where well-designed screening tools, integrated into electronic health record systems for both children and adults, could potentially increase identification.

Health-care settings face multiple, competing screening priorities, such as intimate partner violence, pain levels, immunizations, and depression. Introducing another screening into complex health-care workflows runs the risk of adding more noise in already busy clinical work. Moreover, victims of trafficking may interact with a wide variety of health-care contexts and providers.[9] Designing a technology-based screening intervention to fit all contexts is challenging. Efforts that target specific clinical contexts have shown promise, such as work to implement the Polaris Project Medical Assessment Tool in the emergency department at the University of Kansas Hospital.[26] Tools that allow confidential reporting, such as electronic questionnaires completed by the individual, might prove helpful, as was previously demonstrated for reporting intimate partner violence.[27] Developing validated screening instruments is critical, but development efforts also need to assess the implementation context, clinical processes, and technology infrastructures to ensure the feasibility of screening implementation.

Clinical decision support
Identifying potential trafficking victims is an important first step, but clinicians and health-care systems also need to know what to do once they have concerns that someone is a trafficking victim.[20] Medical informatics could contribute significantly to providing guidance on next steps through clinical decision support (CDS), similar to interventions that have been implemented for child abuse[28,29] and intimate partner violence.[30] Health information technology can assist with integrating screening and responses to trafficking into clinical work. Responses to trafficking typically have important local components, based on legal requirements[31] and the availability of social resources.[11] A trafficking CDS could link best practices for assisting trafficking victims across contexts while incorporating local contextual requirements. Developing CDS that is modular and transferable, using national standards, could support the widespread implementation of guidance on assistance for trafficking victims and help link victims to appropriate local resources.

Community-facing tools
Technology is not necessarily constrained by the walls of a medical center, and another area where medical informatics could contribute to combatting trafficking is through public health informatics and community-facing tools. Law enforcement agencies, social service providers, and community organizations are already using technology

in multiple ways to combat trafficking and assist victims.[32,33] Medical informatics could add a health-care focus to these existing community-based efforts. For example, school nurses might interact with trafficking victims,[2,34] and screening tools in school health settings could help connect nurses to additional resources for further health-related assistance. Partnerships with community-based health-care providers, such as Federally Qualified Health Centers and Planned Parenthood, and with health-focused community groups could widen the reach of screening and intervention technology and also increase community awareness about trafficking. Outreach directly to marginalized, at-risk populations who have access to mobile technology, such as homeless youth[35–37] and victims of intimate partner violence,[38,39] is another area where medical informatics could potentially play a role. Such partnerships have already proven important in combatting crises that exist within and beyond medical centers, like the opioid crisis.[40] Approaches such as community-based participatory research could assist with the definition and design of tools for community health settings, and are crucial for engaging with existing community efforts and building collaboration with people directly involved in fighting trafficking.[41]

Descriptive and predictive analytics

A longstanding challenge in the identification of trafficking victims is that people at risk or who are currently being trafficked are members of what sociologists have described as hidden populations: groups for whom no sampling frame exists and for whom privacy concerns create barriers to accurate data collection.[42] Researchers, non-profit organizations, and law enforcement agencies have begun exploring the use of data analytics to help with trafficking identification by tracing information trails left by traffickers on social media, online classified advertisements, and other online sites.[2,43,44] The growth of data analytics in health care presents a major opportunity to extend these analytic efforts into health-care settings. First, by more accurately describing the scope and scale of the problem, we can contribute to better awareness about human trafficking, and perhaps lead to improvements in screening. Could data analytics help identify defining characteristics of trafficking victims present in electronic health records? Data analytics could potentially be used to refine screening instruments for use in health-care settings and could contribute to the validation of screening instruments. Could predictive analytics be used to identify those individuals at risk for trafficking, inform the design of interventions, and capture the potential downstream health consequences of trafficking on victims? These types of analyses could then be used to connect people to resources and assistance programs. The tremendous fragmentation of health data across providers and organizations poses a major challenge to these types of large-scale data analyses, but also an opportunity for collaboration across organizational boundaries and with public health agencies.

RESULTS

The causes of the scourge of human trafficking are complex and multidimensional, and victims are not homogenous. Even perfect screening and decision support tools in health-care settings will fail to identify some victims and cannot aid those who do not have contact with health-care providers. There are also risks that technology interventions related to issues such as trafficking could lead to unintended, negative consequences that are difficult to predict: individuals may avoid or not be allowed to seek needed health-care services

because of concerns about identification. Despite these limitations, issues such as trafficking challenge medical informatics as a field to take on ethical obligations, shared with health-care providers,[45] to address trafficking and other complex, painful societal problems, such as child abuse, infant mortality, self-harm, and addiction to prescribed painkillers. As the scope and reach of medical informatics continues to expand beyond the boundaries of health-care settings and into communities, homes, and schools and as approaches such as large-scale descriptive and predictive data analytics become well established, what steps should we as a field take to move forward?

To address the pressing need for medical informatics tools focused on human trafficking, we propose a research and implementation agenda (Table 1), focusing on the highest priority and foundational efforts, with ideas for further development. The first area, Foundation, involves establishing the people/organizational, process, and technology components that are critical to begin moving forward. The second area, Evaluate and Expand, builds on the fundamental first steps in Foundation to create additional areas of focus and provide the sociotechnical components needed to expand interventions. The third area, Future Exploration, moves into additional contexts and more challenging areas where substantial additional work is needed to identify the paths forward.

DISCUSSION

The first context in which to focus efforts is pediatric and adult emergency department settings, since research indicates that a higher percentage of trafficking victims seek care in emergency departments.[11,13] Although multiple screening instruments exist, the validation of these screening instruments varies and has not been done on a large scale. To this end, using large-scale electronic health record databases may provide a window to retrospectively validate screening instruments, and may provide an opportunity to identify trafficking indicators in electronic health record data, much as has been done with indicators of homelessness.[46,47] Once a trafficking screening instrument is validated, the instrument can be translated into a transferable electronic tool that can be implemented and rigorously evaluated across organizations. Additionally, the development and integration of educational resources for medical students and health-care providers into existing technology-supported delivery approaches would provide a first step towards increasing awareness of this issue among providers. Although emergency department settings offer the highest immediate potential impact related to trafficking, screening and intervention approaches are also needed for primary-care settings, including walk-in and community clinics.

CONCLUSION

Technology is only a piece of the puzzle, however, as it is critical to have structures and resources in place to support ongoing, trauma-informed care delivery for trafficking victims.[48] Approaching the problem from a sociotechnical perspective, focusing on people/organizational, process, and technology components, would provide a firm foundation for further work in this area. The research and implementation agenda that we have identified faces multiple potential barriers, several of which we have already discussed (eg, alert fatigue, hidden sampling frame). Applying concepts from Implementation Science, such as rigorously assessing barriers of and facilitators to the widespread implementation of tools and processes, and the development and evaluation of implementation plans, could provide

Table 1. Sociotechnical approach to trafficking research and implementation

Foundation: critical elements required to begin moving forward	
People and organizations	• Establish local and regional partnerships with community-based health-care providers and health-focused community groups
	• Develop and disseminate educational outreach to medical students and health-care providers
	• Develop cross-organizational momentum for action
Process	• Rigorously assess barriers and facilitators to identification of victims, integration of proposed technology into clinical work, and interventions to assist identified victims
	• Identify existing trauma-informed intervention strategies
Technology	• Technology support for educational outreach activities
	• Data analytics to describe the scope of the problem
	• Screening tools for victim identification, validated on large samples across institutions
	• Initial clinical decision support development
Evaluate and expand: areas of focus and sociotechnical components to continue	
People and organizations	• Expand partnerships on the regional and national levels
	• Work with community partners for planning, implementation, and evaluation
Process	• Refine existing trauma-informed intervention strategies
	• Identify/develop additional trauma-informed intervention strategies
	• Evaluate initial implementation of clinical decision support and integration into workflow
Technology	• Refine clinical decision support based on evaluation
	• Broadly implement and evaluate clinical decision support in emergency department contexts
	• Explore combinations of predictive analytics with clinical decision support
	• Develop predictive analytics approaches to prospectively identify victims; validate these approaches across institutions and regions
Future exploration: building on previous stages while exploring additional actions	
People and organizations	• Continue working with community partners for planning, implementation, and evaluation
	• Expand national partnerships and explore international partnerships
Process	• Evaluate implementation strategies to assist with successful expansion into new contexts, including barriers and facilitators to expansion
	• Refine trauma-informed intervention strategies, including for additional populations and contexts
Technology	• Continue to build combinations of predictive analytics with clinical decision support
	• Widely implement clinical decision support in primary care, community-based health-care providers, and other contexts

a way to categorize these barriers and potentially assist with the successful widespread dissemination of solutions.[49,50] The path forward includes research to identify effective, evidence-based approaches and technology to support the wide-scale, transferable implementation of human trafficking screening and intervention into routine clinical practice across contexts.

AUTHOR CONTRIBUTORS

KMU developed an initial draft of the manuscript and incorporated feedback from the coauthors. CGW and EWC reviewed drafts, provided feedback, and suggested additional directions for consideration.

CONFLICT OF INTEREST

None declared.

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