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Ethical challenges in student global health research projects

A Thesis Submitted to the
Yale University School of Medicine
In Partial Fulfillment of the Requirement for the
Degree of Doctor of Medicine

By
Katherine Rebecca Standish

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Ethical challenges in student global health research projects

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U.S. students are participating in global health electives and research in low- and middle-income countries (LMIC) in increasing numbers, yet the significant ethical challenges they face have not been well documented. We conducted a mixed methods study of graduate, health professional and undergraduate students at a research-focused university about their experiences conducting global health research activities, focusing on ethical challenges and support for addressing those challenges. An online, structured questionnaire was completed by 123 participants, and in-depth, semi-structured interviews were conducted with 17 participants and analyzed using the constant comparison method. Among questionnaire respondents, 31% reported a significant or moderate impact of ethical challenges on their fieldwork, and 36.6% felt well prepared to deal with those challenges. Ethical challenges, described by both questionnaire and interview respondents, fell broadly into the categories of human subjects protections, impact of research, corruption, and scope of practice. Most students (76%) had received some form of pre-departure ethics training, but many felt those sessions were not well aligned with actual experiences. Additionally, respondents expressed a desire for more faculty, peer and host support before, during and after fieldwork. These results suggest a need for universities to develop and implement standards for preparation and oversight of student research activities in LMIC.

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Introduction

Growing numbers of undergraduate, health professional and post-graduate trainees from high-income countries are participating in global health field experiences in low- and middle-income countries (LMIC).^{1,2} In addition to clinical activities, trainees undertake community service, outreach, education and human subjects research.³ The challenges and benefits of such experiences for trainees, local populations, hosts and sending institutions are beginning to be described and debated.⁴⁻⁶ In addition to practicing beyond students' level of training, the balance of benefits to students and the local community of such activities, the burdens on hosts of student visitors, and questions of addressing system health inequities, are all entering the discourse around global health training and fieldwork.

For those students participating in research activities in LMIC, these challenges and benefits overlap with the ethical dimensions of research, which range from the micro level of autonomy and protection of research subjects, to larger questions of fair benefits and social justice. This broad definition of global health ethics arises from the recognition that the very inequities that inspire global health engagement by high-income country practitioners, researchers and trainees also create ethical challenges within that engagement.^{4,7} In this paper, we explore the moral questions that arise during research. Some ethical challenges may be those that fall within the rubric of human subjects protection standards and norms of research. We are also interested in those challenges that the researcher must address, but that might not be of interest to IRBs, or that must be addressed in the moment. Guillemin and Gillam refer to these ethical challenges that come up in the daily practice of carrying

out research as “ethically important moments” and suggest that they are just as important to the researcher and research participant as those issues that concern the IRB.⁸ Hunt and Godard have applied this concept of “ethics in practice” to the unique challenges faced by trainees carrying out research in settings of poverty, such as navigating requests for financial or clinical assistance where resources are limited.⁹

The research setting adds an additional dimension to the challenges trainees face. Ethical guidelines for research may vary by country, and the often unequal distribution of research resources and benefits between low- and high-income partners complicate collaboration.¹⁰⁻¹² Furthermore, trainees’ limited experience, resources and time may make it difficult to establish successful research projects in low-resources settings, and their priority on learning may interfere with other outcomes such as local benefit.^{4,9}

Qualitative researchers have begun to explore the experiences of students on global health fieldwork, though primarily within clinical electives. On international health electives, studies have described complex ethical concerns among students, including scope of practice, working in a different cultural context and with vulnerable populations, power dynamics and privilege as an outsider, and questioning how best to contribute as students.¹³⁻¹⁶ While there is likely to be some overlap with clinical electives, no studies have described the challenges of students participating in research activities in low-income settings.

Along with the recognition of such challenges comes the need for renewed attention to ethical frameworks and ethics education.^{17,18} One way to combat these challenges is through rigorous pre-departure ethics trainings for those embarking on

global health activities; many universities are beginning to implement this approach.^{19,20} However, there is scant published research on pre-departure ethics trainings and outcomes, and those few focus on clinical global health activities.^{21,22} Pre-departure ethics trainings are often designed and implemented without empirical evidence regarding content or pedagogic method, and they are usually not rigorously evaluated.^{23,24} Additionally, support for trainee research should not be limited to time prior to fieldwork; students also benefit from support during and after their fieldwork.²⁵

Published guidelines, such as those developed by the Working Group on Ethics Guidelines for Global Health Training,⁵ have described the complex needs that must be attended to in equitable global health activities for trainees. They have also called on institutions to provide pre-departure trainings and ensure research receives are ethically conducted and beneficial to host communities, but the practicalities of how to implement such recommendations are left to individual students, faculty and universities to develop. Individual university policies are often based on faculty and administrator experiences. Missing from these conversations are the perspectives of two key groups in trainee global health research experiences: the host preceptors, organizations and communities, and the students themselves, both in high- and low- and middle-income countries. Here we describe the results of a study of HIC student perspectives on ethical challenges in the conduct of global health research.

Statement of Purpose

The purpose of our study was to explore student experiences of ethical challenges in the conduct of global health research in low- and middle-income countries.

Specific Aims

1. Explore and identify the ethical challenges that students encounter while conducting health fieldwork in low- and middle-income countries.
2. Understand the ways in which students respond to ethical challenges and the support structures that assist them.
3. Develop recommendations for preparation, mentorship and support around ethics for students conducting global health research.

Methods

Research approach and study design

We employed a mixed methods design incorporating a quantitative structured questionnaire and qualitative semi-structured interviews. This design allows for exploration of complex social interactions that may have aspects best captured qualitatively and others quantitatively. We used an explanatory sequential model,²⁶ in which quantitative data collection via online questionnaire preceded qualitative interviews with a subset of questionnaire respondents. The quantitative and qualitative strands were of equal priority such that neither dominated.²⁷ While data collection was sequential, other activities were iterative with each arm of the study informing the other. Sampling, data processing, analysis and interpretation had multiple points of interface between the qualitative and quantitative strands, as described below. Interpretation happened concurrently, considering both qualitative and quantitative findings together in an inductive fashion.

Study population and sampling

We surveyed current students and recent graduates of a private research-focused university who had participated in health-related research activities in LMIC between 2009 and 2013. The population of potential participants included students conducting individual projects with minimal faculty involvement, masters and doctoral research, interdisciplinary group projects, and internships. While some students were not conducting original research, most were involved in research-type

activities, such as data collection for program evaluations, as reported in surveys. In interviews, students who did not do original research reported similar ethical challenges to those who did formal research. Thus, we refer here to respondent's activities at the host site as research, defined as all research-like activities. Students at this institution experience varying support structures through different departments and fellowships, ranging from single pre-departure travel safety meetings to semester-long protocol development courses, ethics trainings and post-fellowship debriefings.

Criteria for participation in the study were the following: 1) enrolled student between the years 2009 and 2013 and 2) engaged in health-related fieldwork in a LMIC during that time. Potential participants were identified through university fellowship records as well as personal communication of the author with global health faculty at individual schools. Potential participants were further identified by sorting fellowship records for health related research projects in low- and middle-income countries as defined by the World Bank.²⁸

Interview subjects were identified from among questionnaire respondents. Names and email addresses were collected from questionnaire participants who were willing to participate in a one-on-one interview, and those records were kept separate from questionnaire results. From that list, a purposive sample was obtained to ensure representation among graduate, health professional and undergraduate students, and both men and women.

The Yale University Human Subjects Committee determined the study protocol was exempt from review (protocol # 1309012774). Approval was sought and received from the Dean of Student Affairs at the medical school to contact medical

students.

Data collection and processing

Questionnaire

The questionnaire was designed by KS and the research team. Questions addressed students' activities at the host site, type of university-provided support and resources, pre-departure preparation, faculty and host advising, ethical challenges, language barriers, and the outcomes and impact of the student's project. Many questions allowed for additional observations as write-in responses. The questionnaire was piloted to refine content and ensure usability of the software. The questionnaire was implemented using Qualtrics Survey Tool (Qualtrics Research Suite 2013-14, Provo, UT), which allowed for distribution of the online survey to pre-defined email lists, and subsequent data collection and data management.

Potential participants were invited via email to complete the anonymous questionnaire. The email assured respondents that student researchers separate from the university fellowships office were leading the study, and that their responses would be de-identified and aggregated. Questionnaire data collection occurred during November 2013-January 2014. Completed surveys, defined as those containing more than 2/3rds of question responses, were downloaded from Qualtrics for further analysis. The questionnaire took an average of 15 minutes to complete.

Interviews

Semi-structured interviews were conducted to capture the context and process of issues under study, and serve to illustrate and explain quantitative findings. The study aims as well as preliminary questionnaire results were used to define interview objectives and to write an interview guide for use by the interviewer (Table 1). Interviews focused on ethical challenges and responses to those challenges, relationships with host organizations and preceptors, support, and experiences working independently or with other students. The interview guide was reviewed and revised by all members of the research team initially and after the first two interviews. At that time feedback was also provided to the interviewer (KS) on interviewing style and content of interviews.

Potential participants were contacted via email to participate in the study via online videoconferencing. All interviews were conducted by KS. Potential participants included both current students and recent alumni/ae, and thus were not all in the same geographic location. Many potential participants continued to work and live internationally after graduation. To accommodate this without limiting our sample, interviews were conducted via online video- or audio-conference using Skype. Online videoconferencing is a novel medium that offers greater flexibility of time and privacy of location, while maintaining the visual cues that are lost with other interview media such as telephones²⁹. Interviews began in video to make introductions, but due to slow Internet speeds in particular for participants outside of the U.S., were often conducted primarily as audio. Our study sample is young and technologically adept, and all participants had experience with international work,

and thus we reasonably expected them to be familiar and comfortable with such online communication tools. No participant expressed hesitancy or unfamiliarity with Skype. On occasion calls were dropped, but easily and quickly reinitiated. Interviews took around 45 minutes, ranging from 35 to 85 minutes. The interviewer wrote notes immediately after each interview. Each interview was transcribed by one of the authors (KS and KM) and reviewed for accuracy by the other transcribing author. Interviews were conducted until thematic saturation was reached, as determined by discussion amongst the research team.

Table 1. Interview Guide

Questions

- In developing this project, how did you decide where to go and what to do?
- In your own words, describe to me what ethics means to you.
- If any issues arose that you think had an ethical component - what happened and how did you respond?
- Tell me about the people who were most helpful to you in carrying out this project.
- If you worked within a group, or individually, how did that impact your experience?
- How do you think the results of your project will impact the community where it was conducted?
- If a student going to a similar site or doing a similar project asked you for advice, what would you tell them?
- What suggestions do you have for the university or your professors to help future students?

Probes

- Can you give me an example of...?
 - Can you tell me more about...?
 - How do you think that impacted your experience?
-

Data analysis

Questionnaire

We compared responses of participants who reported they were not prepared or somewhat prepared to deal with ethical dilemmas in their fieldwork, to those who reported being as well prepared as possible. We tested bivariate associations with chi-squared significance values and Fisher's exact test values for frequency less than five. Statistical analyses were performed using IBM SPSS Statistics Version 22.

Write-in responses, which were often of significant length and content, were analyzed using qualitative methods to identify common themes. Three authors (KS, KK, SA) independently reviewed 20 questionnaires, from which an initial coding structure was created. Two additional sets of 20 questionnaires were coded in order to refine the coding structure, which was reviewed and finalized with the other two members of the research team. The first three authors then coded the remaining questionnaires. Responses were coded using Dedoose Version 4.5, a web application for managing, analyzing, and presenting qualitative and mixed method research data (Los Angeles, CA: SocioCultural Research Consultants, LLC).ⁱ

Interviews

Interviews were analyzed in an iterative fashion, beginning with immersion. Two authors (KS and KK) read the first six interviews and discussed their initial impressions including similarities and differences from questionnaire findings,

ⁱ After survey analysis was complete we discontinued use of Dedoose because the company reported a loss of data of other users. This did not affect our research or data, however we chose to switch to Atlas.ti, a popular qualitative research software that allows for storage of data on personal devices.

possible new codes, and themes to be explored more thoroughly in subsequent interviews. The interview guide was revised accordingly. Interviews were then coded for common concepts and themes using the constant comparative method.³⁰⁻³² Transcripts were imported into Atlas.ti version 7, a software package that facilitates qualitative coding and analysis (Berlin, Scientific Software Development GmbH). Three authors (KS, KK, NA) independently coded two transcripts using an initial set of codes identified in questionnaire open-response analysis as well as new codes created by each researcher. The coding team then met with a fourth research team member (SS) experienced in use of Atlas.ti and team coding, to review the coding structure and discuss initial impressions. Two additional transcripts were coded in the same fashion, and the resultant coding structure was then reviewed by the two senior research team members (KK, MM). A final coding structure (Table 2) was then used by two of the coding authors (KS, NA) to code a fifth transcript. The remaining 12 transcripts were coded by KS.

Code co-occurrences, salient concepts discussed at team meetings, and memos written by the coding team members were used in analysis of the final set of codes. Themes and resultant findings were reviewed by KS, KM, KK and MM. Common themes from interviews have been further considered in their relationship to or ability to explain survey responses, thus enriching quantitative results of the study, and vice versa.

Table 2. Final Code Structure

Ethical challenges*Defining ethics*

Autonomy, beneficence, justice and equity, local benefit

Ethical challenges

Human subject protection (consent, confidentiality, benefits, vulnerable populations, adverse events), research benefits, corruption, student scope of practice

Factors influencing or defining ethical challenges

Local legal and ethical standards, social, cultural and economic context, perception of outsiders, student's limited experience at research site, student's limited research experience and training, restrictions on student resources

Addressing ethical challenges*Relationships as support*

Relationships with host and faculty advisors, relationship with host organization, working in teams, working with peers

Preparation

Pre-departure training, coursework, peer networks

Learning to do research*Learning to do research*

Follow-up and dissemination of research, local impact or benefit, match/mismatch to local needs, defining objectives, input of host or community, logistical challenges, impact of language

Student experience

Expectations, motivation, student role, responsibilities appropriate to level of training, impact of experience, safety

Trustworthiness & Validity

Multiple techniques were used throughout the qualitative arm of the study to enhance trustworthiness and validity.³³ The research team included a variety of disciplines, training levels and research and global health experiences. KS and KM are trainees with global health experiences in LMIC as a student (KM) and research

manager (KS). NA and SS have significant qualitative research experience coding in teams and managing projects using Atlas.ti, and NA has experience working in LMIC. MM has qualitative research experience in educational settings and advises university students on global health careers. KK is a public health faculty with ongoing international collaborations and directs global health fellowships and advises student projects in LMIC. Such diversity of experience permitted interviews and survey data to be viewed from different perspectives. For instance, KM was actively working as a fellow in a small NGO in Thailand during coding, and recognized interviewee experiences as an “outsider,” while KK introduced the perspective of program managers and the inconsistencies in pre-departure training.

The credibility of research findings was further enhanced through triangulation and peer examination: early conference presentations which facilitated conversations with colleagues from throughout North America, preliminary reporting to faculty leaders in global health and international studies, and ongoing conversations with trainees who were actively working in global health projects. An audit trail within Atlas.ti included detailed research team and coding meeting minutes, preliminary analysis, and extensive documentation of coding structure development and code definitions. A research journal (maintained by KS) includes interview notes, personal reflections, methodological review and readings, and initial thematic and analytic impressions.

Results

The authors emailed the study invitation to 280 current and former students who had received fellowships to conduct global health fieldwork in a LMIC, of whom 127 (45.4%) completed the online questionnaire. Four respondents did not answer the question regarding preparedness for ethical challenges and therefore were excluded from this analysis. Of the 123 included respondents, 68.0% were female, ranging in age from 18 to 40 years at the time of their fieldwork (median 22, Table 3). Sixty-four respondents (52.0%) were undergraduate students and 59 (48.0%) were graduate or professional students, primarily in public health (54.2%) and medicine (27.1%). Respondents spent a median of 10 weeks conducting research at sites in 42 countries. Interview respondents were similar across all demographic areas.

Table 3. Participant characteristics

	Survey Respondents n=123 (%)	Interview Respondents n=17 (%)
Gender		
Female	83 (68.0)	10 (58.8)
Male	39 (32.0)	7 (41.2)
Median Age (Interquartile Range)	22 (4)	21 (4.5)
Type of student		
Undergraduate	64 (52.0)	10 (58.8)
Graduate/Professional	59 (48.0)	7 (41.2)
Graduate/Professional field		
Public Health	32 (26.0)	6 (35.3)
Medicine	16 (13.0)	1 (5.9)
Other ^A	11 (8.9)	0 (0)
Median weeks spent doing fieldwork (Interquartile Range)	10 (4)	12 (6)

^A 3 Physician Assistant, 6 Nursing, 1 Anthropology, 1 Environmental Studies

Ethical challenges

Thirty-nine percent of respondents reported experiencing an ethically challenging situation during their fieldwork and 31.1% reported a significant or moderate impact

of ethical dilemmas on the execution of their fieldwork. In interviews and questionnaires, respondents described ethical challenges that fell within the following categories: human subjects protection, benefits of research, corruption, and scope of practice (Table 4).

Table 4. Types of ethical challenges experienced by participants

Category (No. times reported)	Example
<i>Human Subjects Protection</i>	
Difficulties with consent process (8)	“The biggest ethical challenge for us was obtaining truly informed consent from research participants who were illiterate or semi-literate and who had never heard of a research project before. With this minimal level of knowledge, it was very difficult and time-consuming to explain to participants exactly what we were doing and ask them if they truly wanted to participate.” [F, UG] ²
Barriers to confidentiality (8)	“I remember having a difficult time with privacy, as there were no private rooms in which to conduct the interviews. We worked in a community-based organization and there were constantly people walking through the interview or just sitting in and listening. I tried to make sure privacy was maintained but it wasn't always possible.” [F, GR]
Protection of vulnerable populations (10)	“It becomes a challenge when you don't know the laws and you're working with potentially a population that's breaking the law... So it was really important to look at confidentiality about having no identified documents, to have a location that no one would be identified specifically just by entering that location.” [F, GR]
Participant compensation (6)	“When we showed up we had been told by the IRB we had to compensate people for these interviews, and the director of the hospital said if you were to pay people for these interviews you'd have the newspapers here tomorrow morning saying, ‘They're giving out some money.’” [M, UG]
Unprepared to respond to adverse event (2)	“I don't know what the rules were about that and I didn't know if I was a mandated reporter in that situation. I didn't know if this was a point where I needed to break confidentiality and speak to the clinic director because I didn't know what was culturally appropriate and I didn't want to put the patient in a bad situation.” [F, GR]
<i>Benefits of Research</i>	
Lack of impact of research (3)	“Realizing that it's somewhat unlikely the people we were surveying were ever going to benefit from the work we were doing! This is not something one can easily confront, and we struggled with it for weeks.” [M, UG]
Misunderstanding of benefit (3)	“And then there was also an issue that came up where people thought that if they had participated in the project that they would now be sponsored by the organization. Which was not the case. And that was a really unfortunate side effect of the project.” [F, UG]
<i>Corruption</i>	
Bribes and requests for money (9)	“The [host site] IRB administrator told me that she would make sure that my IRB application got through if I made a donation to her church's fundraiser. I donated about \$5.” [F, UG]

² Respondents are identified by gender (F or M) and if they were an undergraduate (UG) or graduate (GR) student at the time of their global health experience.

Conflicts of interest (1)	“So the center we ended up working with was taking money both from [industry] and the government. ... So I tried to very sensitively work around what would be a conflict of interest and totally corrupt in the U.S.” [M, GR]
<i>Scope of Practice</i>	
Asked to perform beyond training (11)	“Often asked to intervene in ways that I was not prepared for. I would explain I couldn't do that, and they understood.” [F, UG]
Educational status misunderstood (3)	“People there see us – we were wearing scrubs cause we were in the hospital – and assume we were doctors, and we tell them ‘oh no we’re not,’ but they’ll still call us doctor, which is just totally not ok. But regardless it falls on us even more the responsibility to be excessively aware of what we should and shouldn’t be doing.” [M, UG]

Human subjects protections

Respondents reported a variety of difficulties in carrying out human subjects protection protocols. Consent procedures were often complicated by low-literacy and unfamiliarity with research and the concept of consent among research participants. One respondent, working with a team of American students, described the case of a student leaving out much of the content of the consent materials when speaking to potential participants. Another, doing an environmental study, felt that consent requirements were not as strict as they would be in the U.S. Once participants had consented, respondents faced unexpected difficulties in maintaining their confidentiality. Multiple respondents found that the institutions where they were conducting research did not have physical spaces to conduct private interviews.

Working in low-resource settings with high burdens of disease, for some respondents protecting confidentiality dovetailed with protecting vulnerable populations. One participant worked with his research team to creatively maintain confidentiality for HIV-positive research participants, who would take a written survey together in a room, but would step outside with research if they had a question. Another respondent carefully worded her research reports to protect

participants' whose reproductive health choices could put them at risk. In one case a respondent working with sex workers in a country where there had been documented human rights abuses against sex workers detained by the government, describes being interrogated by a police officer about her research, and ultimately moving her research site to ensure her participants' confidentiality and safety.

Participants working with vulnerable populations were often unaware of their vulnerabilities upon beginning their fieldwork. Many described only learning of the low literacy levels of their research population upon arriving, and adjusting data collection and consent procedures accordingly.

We ended up having to read the surveys aloud to many participants, which took much more time than anticipated, and made it so that we had to worry about biasing their responses. [F, UG]

Another found, upon beginning her questionnaire, that the definition of "minors" that she brought from the U.S. and which was included in her IRB protocol, was not the custom in the host country:

I would go to a house and ask someone's age, and they would say "my mom's not here, no one older than me is here, but I'd love to do the survey." And I'd ask how old they were and they'd say 15 or 16, and this would be a 15 or 16 year old with a baby on her hip that was her baby. But the IRB hadn't approved me to interview minors so I would end up doing the survey with them and throwing it out because I couldn't technically survey them, but it was more culturally insensitive to be like "No, you're not an adult, I can't talk to you" than it was to just do the survey and then not include it. [F, UG]

One respondent describes a prison guard who coerced inmates to participate in his study:

While recruiting prisoners I said during an information session that participation was voluntary. The prison guard then rounded up all of the people who did not want to participate and tried to convince them to participate very coercively. He was genuinely trying to help me and didn't understand why someone wouldn't have wanted to participate. Luckily I was able to delineate through the sign up

sheet who were the people who signed up last, who were those who initially refused, and when they were called for the study I performed another consent procedure re-stressing the voluntary nature of participation. All of them ended up participating. [M, GR]

Coercion also surfaced with the issue of compensation for research participation. In two cases, plans for cash payment were replaced with a small gift for participants, for fear of coercion or media attention. In another case compensation drew participants who did not meet inclusion criteria:

One subject interviewed was under the age of 18, which was against my protocol, but he really wanted to do the interview in order to receive the compensation. I conducted the interview with him anyway but excluded his responses from my data. [F, GR]

Human subjects protections broke down in cases of adverse events that the student had not anticipated and had no protocol for how to respond. In one case, a research participant reported suicidal ideation, and the American student was uncertain about the appropriate response, in terms of confidentiality and mandated reporting, in the country where she was working. Another student, involved in a project that included both research and clinical activities had not prepared for confidential results reporting, counseling and follow-up of HIV testing:

We were testing individuals for HIV on a beach with a doctor and a nurse, and found that a couple was HIV positive. We were not in a setting with enough privacy to run the tests and scrambled to figure out how to talk to the couple in private. They also had a newborn baby who they did not know if he or she had HIV as well. Thinking back on it, I don't know if we should have tested the child for HIV or not. We ended up not testing the baby for HIV. We were so taken aback and had to think quickly on our feet. We probably should not have ended up in that situation. We were ambitious with expanding our testing efforts, but I don't know that we fully prepared or had the support necessary to expand outside of clinics and hospitals. [F, UG]

Local benefits of research

Respondents, many of who reported being motivated to participate in global health research by a desire to improve health and equity, in many cases identified the lack of research impact in local communities – not just to individual research participants – as an ethical dilemma.

In addition to recognizing the minimal impact of their research, some respondents were troubled by research participants' overestimation of the direct benefits to them. In particular, seeing an American researcher led participants to believe they would receive some direct benefit:

And this is just my observation, that potentially people who participate and see an American come in to do work, they have some sort of sense, or they have some sort of expectation that you're going to give them something that we're not giving them. [F, GR]

Another respondent suspected that this increased interest in participating in the research, as she found participants more willing to take the survey when she administered it than by those from their own community:

I think it's a sad fact about how little ability these areas have had to have economic progress and health progress, that they look at Americans and think "Oh great," and people from their own community come and they think "you won't do anything." [F, UG]

Corruption and bribes

In addition to the challenges associated with research participant compensation, multiple respondents encountered corruption, bribes and unexpected requests for money by host site IRB, government, university and hospital representatives. Some respondents paid small bribes that were requested of them, but

most did not pay bribes that were asked of them and instead modified their research protocols.

I had to change my sampling technique a bit - I was originally planning to work through schools, but ultimately had to work through home visits, due to a lack of efficient coordination with the principals and their desire to receive bribes in exchange for collaboration. [F, UG]

Students reported corruption outside of research as well, such as at police checkpoints and by local vendors. Other respondents reported monetary requests from collaborators, the nature of which – bribes, or simply unexpected costs and fees - was not always clear.

We were faced with budgetary issues while abroad and the host professors we were working with continuously asked us for more money though we didn't have it. [F, UG]

There was something a little bit – for lack of a better word – sketchy about the whole situation. I wasn't ensure entirely how to handle it because I wasn't aware of these issues and they kind of seemed to be things that they just requested. ... I talked to [my advisor] about it a bit and his advice was to move forward with what you can, because they were asking for a large sum of money that I couldn't give them. [F, GR]

Scope of Practice

Many respondents, regardless of field of study, reported being asked to perform and take responsibility beyond their level of training. Respondents were invited to participate in clinical activities they were not trained to perform. Others felt uncomfortable being misidentified as a doctor. One public health graduate student found she was assumed to be a physician and struggled to explain her discipline in terms understandable in the host country where public health was a subspecialty for physicians. An undergraduate recalled the complexities of responding in a respectful way that would not alienate or offend community members and research participants:

Originally my strategy with dealing with people who came to me with their other health problems was just to say “I’m not a doctor, I’m really sorry.” And [the host advisor] was like “that’s not going to work because they don’t believe you, they know you’re a doctor. And you saying that you’re not a doctor doesn’t change that.” She told me it would be better to just listen and take into consideration what they’re saying, provide any advice I can, and just direct them toward health posts. Which I did, and it worked well. I was sort of fixated on that there are really strict rules about this in America and I have to follow them. So she was like “follow your rules, but also do this.” [F, UG]

For others, their scope of practice was challenged outside of the clinical realm.

Host advisors asked students to perform research and public health tasks that they were not comfortable with, such as helping to write papers in a field they have no knowledge of, or responsibility for local response to an epidemic. For others, limitation in their fluency in the local language led to similar experiences of practicing beyond their abilities. One respondent worked on a team of American student researchers and was the only one who spoke the local language, but often felt her fluency was inadequate for communicating complex scientific and social issues with hosts. Another questioned the ethics of students with low language abilities interviewing research participants:

However, even having completed [advanced university Spanish courses], I sometimes had difficulty understanding the participants when they spoke quickly or used local slang. Therefore, I felt that my advanced Spanish level was almost the bare minimum that was needed to complete the project. There were other students on my trip who had less Spanish experience than I did, and I worried about the ethics of having them conduct surveys when they sometimes weren't able to understand questions from participants and clarify the answers. [F, UG]

Factors that shape ethical challenges: Student researchers in low-income settings

We identified a number of common factors that influenced and shaped the ethical challenges respondents described. Those factors fit within two larger themes:

working in a low-resource context and being a student (Table 5). As students, respondents had several limitations in experience and resources – little to no prior experience working in the host country, limited technical or research skills, and fewer resources for carrying out research. Additionally, they face time constraints in finishing a project over a summer or winter break, and may have thesis or funding requirements that dictate aspects of their project. Working in low- and middle-income countries, they carry out their research in contexts very different from what they are accustomed – different legal, ethical and social standards, unfamiliar institutions, and variable perceptions of foreigners. These two factors – being a student and working in LMIC – act both independently and together to mold the ethical challenges respondents faced.

Table 5. Factors influencing ethical challenges (codes and sub-codes)

Research context: low- and middle-income countries	Researcher: Student
<p>Different local legal and ethical standards</p> <ul style="list-style-type: none"> - Laws, legal standards, social institutions - Different ethical frameworks and standards - Local ethics review process, requirements - Different professional designations and training <p>Working in a different social, cultural and resource context</p> <ul style="list-style-type: none"> - Different vulnerabilities for research subjects (e.g. legal, stigma, violence) - Low literacy and educational levels - Host organization and community lack of resources, poverty - Participants unfamiliar with research and research regulations <p>Perception of outsiders/foreigners</p> <ul style="list-style-type: none"> - Views of foreigners as yielding influence, power, or resources - Expectation that foreigner has advanced knowledge or skills 	<p>Lack of experience at research site</p> <ul style="list-style-type: none"> - Limited support for activities - Limited local language abilities - Student lack of knowledge of site, culture, social structures - Lack of power, influence, contacts <p>Limited research experience</p> <ul style="list-style-type: none"> - Limited experience in discipline or techniques and less rigorous research - Limited experience fulfilling IRB requirements - Limited experience disseminating results <p>Resource limitations</p> <ul style="list-style-type: none"> - Limited access to resources and funding - Limited time for project - Constrained by program or fellowship requirements

The combination of working in a low-resource context and the students' relative lack of experience lay the conditions for ethical challenges and changes to research protocols. In a common scenario, students' lack of familiarity with the research site and population led to significant modifications to their protocol as they adapted human subjects protections and data collection methods to the logistical constraints of resource-limited host organization and the to the needs of low-literacy populations.

We realized that we take knowing how to fill out a questionnaire for granted. This can be very unfamiliar for people in other countries with different levels of education. Therefore, we ended up having to read the survey to some of the participants. We also had to change our protocol from having them sit in a private room, to just ensuring that they had no one reading over their shoulder, since there was no spare space in the hospital for us to set up a private space. [F, UG]

In other cases, human subjects protections were compromised. The following respondent recognized how being a student and a foreigner, particularly when combined, led to improper human subjects protections:

You have to submit this proposal, you say you are going to do certain things, and then the IRB tells you have to do all these certain things and then you have project advisors who are asking you if you're on top of different things, and you're trying to balance all this and sometimes small things get, sort of, skipped over. So, I've seen projects that, um, that approach participants and almost, don't force them to take the survey, but not really the type of consent you'd want. Sort of saying, no, they don't fully understand the project. I think there is a little bit of challenge in the HSC requiring all these paragraphs be read to someone before they do it. You're in this rural town and these people, if you sat them down and read that stuff to them, they'd be like, "Go away, you're a crazy person, why are you just speaking at me for ten minutes?!" There's one girl in particular would skip a lot of different stuff she said she was going to do for her IRB. Also, I think there was definitely not a full recognition sometimes for participants of how long of a survey they were getting into, or what exactly they were doing, they just kind of were wowed by a foreigner who said, "Please, just do it for me." [M, UG]

In this case, the students' lack of IRB and research experience, and the demands of the IRB and advisors, combined with a low literacy population unfamiliar with research themselves, and resulted in a lack of fully informed consent. Furthermore, the issue of coercion is suggested by the observation that the local population's perception of the foreign students led them to participate.

Being a foreigner may also put vulnerable populations, such as sex workers, at risk of being identified or further stigmatized. In this case, a female graduate student confronted this and other risks for her research subjects, while also working with fewer local connections and less knowledge of the local legal landscape.

It becomes a challenge when you don't know the laws and you're working with potentially a population that's breaking the law – like for example sex workers and injecting drug users. Not just breaking the law, but also, if they're found out to be breaking this law, then they're potentially sent to these... for example they have these centers where they're supposed to help reform sex workers and drug users and other populations, but there's not a sense of due process of law. The UNDP has a lot of information on this. So there's a big challenge if someone's found out by the police. So it was really important to look at confidentiality about having no identified documents, to have a location that no one would be identified specifically just by entering that location. So a hotel was an easy place where you're not necessarily identified as a certain person or practicing a certain behavior just by coming in. So that took a lot of thought. The added challenge of because I was a foreigner doing research with less of a link to an organization based there, that I would get more attention, and therefor potentially study participants would get more attention." [F, GR]

This participant had many years of prior professional experience with vulnerable populations in multiple LMIC, and was able to address these challenges. Even so, she went on to describe the limitations she faced as a student, as her move to a hotel consumed both time during her two-month fellowship and a limited research budget that had not included the cost of a separate research location.

Some respondents found themselves challenged by conflicting U.S. and host site requirements from IRBs and advisors:

My host country supervisor told me that I did not need to submit an IRB protocol before starting research (I contacted her many times in the months leading up to starting research), then when I got to [the host country] and saw the IRB application, it said that I had to apply at least 2 months before starting research. I had IRB clearance from [my university] already, and my host country research supervisor told me to not indicate on my [local] IRB application when I would be doing the study, and the IRB panel would never know that I had already started. My [university] advisor told me that I should listen to the host country supervisor.”[F, UG]

In this case, the student’s lack of knowledge of local IRB requirements, dependence on advisors, combined with limited time, led to research without proper ethical oversight.

Addressing ethical challenges: Responses and support

Responding to ethical challenges

Students addressed the challenges they faced using a variety of techniques. Some recognized that their approach to research was very different than that of the LMIC setting they were working in, and adapted accordingly:

While the clinic does conduct some research, this survey was much more western in the way that it asked questions, as it was designed by me (a westerner). The need to sign a consent form for me to look through their medical records and get lab values was also something that confused participants. I had to learn to work with the clinic staff who were translating for me to explain to them the way that things work in the US and why the study was set up the way it was. When they understood it better, they were able to convey it to patients better. [F, GR]

Confronting differences inherent in the LMIC settings in which they were working, many students found compromises to address challenges that they judged to be

aligned with the ethical requirements of their research while still respecting the social structures, cultures and ethical paradigms of the host site. This is illustrated by the two respondents that described interviewing minors, who were not within the IRB-approved age criteria for their studies, and then discarding the data. Others adapted their activities to be better aligned with their level of training, while still fulfilling expectations at the host site that they would contribute to the work:

I was helping with a lot of health worker trainings, a lot of times, people would expect me to be teaching things. I did teach a little bit ... Like ok, I can look into educational research and give you some resources on how to teach better – a sort of training the trainers module. I was constantly reminding them that “yes, I’m here to work and I’m here to learn and I’m here to be of help in terms of what skills I already have, but you actually have a lot more skills than me in terms of being village health workers, or being medics and taking care of people. [F, GR]

Many respondents turned to their U.S. or host country advisors, or both, to discuss problems and possible responses.

I kind of thought that the solution was closer to home than New Haven. So, I think I turned to the staff I was working with there. [F, GR]

No all were able to seek timely advice:

I always sought help or advice by going to my boss or trying to talk to people in the US via email or phone. But, you know, I was the one on the ground, so a lot of times it came down to me making certain decisions and hoping they were the right ones and making them as informed as possible. [F, GR]

Other respondents reported that their host advisors were not readily available, leaving them on their own to address challenges as they arose. Still others utilized a variety of relationships and support structures to address challenges, such as host organization staff and other students with whom they worked or lived.

Preparation and support for ethical challenges

Respondents were asked how well prepared they felt to address ethical dilemmas encountered during their fieldwork: 63.4% felt somewhat prepared or not prepared and 36.6% felt as well prepared as possible. Those who felt well prepared were significantly more likely to be graduate students (45.8% vs 28.1% of undergraduates, $p=0.042$, Table 6) and older (median 23 versus 21 years old, $p=0.018$). There were no differences in preparation for ethical challenges based on research site or research methods. Compared to those who felt well prepared for ethical challenges, those who felt less prepared were more likely to report that they experienced an ethical challenge ($p=0.004$, Table 7) and that their fieldwork was impacted by ethical challenges ($p=0.046$).

Table 6. Demographic and research activities

	Total n=123 (%)	Unprepared for ethical dilemmas n=78	Well prepared for ethical dilemmas n=45	P-value
Gender				0.805
Female	83 (68.0)	53 (63.9)	30 (36.1)	
Male	39 (32.0)	24 (61.5)	15 (38.5)	
Median Age (IQR^A)	22 (4)	21 (4)	23 (4)	0.018
Type of student				0.042
Undergraduate	64 (52.0)	46 (71.9)	18 (28.1)	
Graduate/Professional	59 (48.0)	32 (54.2)	27 (45.8)	
Graduate/Professional field				0.019
Public Health	32 (54.2)	12 (37.5)	20 (62.5)	
Medicine	16 (27.1)	12 (75.0)	4 (25.0)	
Other (PA, Nursing, Graduate)	11 (18.6)	8 (72.7)	3 (27.3)	
Median weeks spent doing research (IQR^A)	10 (4)	10 (4)	10 (4)	0.245
Visited host community or country previously				0.057
Yes	39 (31.7)	20 (51.3)	19 (48.7)	
No	84 (68.3)	58 (69.0)	26 (31.0)	
Primary research site				0.935
Community sites	49 (39.8)	29 (59.2)	20 (40.8)	
Hospital	21 (17.1)	15 (71.4)	6 (28.6)	
Outpatient clinic	22 (17.9)	15 (68.2)	7 (31.8)	

Office-based, library or meetings/interviews	15 (12.2)	9 (60.0)	6 (40.0)	
Laboratory	16 (13.0)	10 (62.5)	6 (37.5)	
Research methods (may report more than one)				
Questionnaires				0.651
Yes	77 (62.6)	50 (64.9)	27 (35.1)	
No	46 (37.4)	28 (60.9)	18 (39.1)	
Interviews, focus groups, ethnographic research				0.667
Yes	66 (53.7)	43 (65.2)	23 (34.8)	
No	57 (46.3)	35 (61.4)	22 (38.6)	
Laboratory experiments				0.594
Yes	25 (20.3)	17 (68.0)	8 (32.0)	
No	98 (79.7)	61 (62.2)	37 (37.8)	

^AInterquartile Range

Table 7. Challenges encountered during research

	Total n=123 (%)	Unprepared for ethical dilemmas (n=78)	Well prepared for ethical dilemmas (n=45)	P- value
Experienced ethical dilemma				0.004
Yes	48 (39.0)	38 (79.2)	10 (20.8)	
No	75 (61.0)	40 (53.3)	35 (46.7)	
Impact of ethical dilemmas on research				0.046
No impact or minimal impact	84 (68.9)	48 (57.1)	36 (42.9)	
Moderate or significant impact	38 (31.1)	29 (76.3)	9 (23.7)	
Median impact of ethical dilemmas^A (IQR)	2 (1-3)	2 (2-3)	2 (1-2)	0.002
Impact of cultural differences on research				0.710
No impact or minimal impact	63 (51.6)	41 (65.1)	22 (34.9)	
Moderate or significant impact	59 (48.4)	36 (61.0)	23 (39.0)	
Median impact of cultural differences^A (IQR)	2 (2-3)	2 (2-3)	3 (1.5-3)	0.525
Impact of poverty and resource constraints on execution of research				0.455
No impact or minimal impact	68 (55.7)	45 (66.2)	23 (33.8)	
Moderate or significant impact	54 (44.3)	32 (59.3)	22 (40.7)	
Median impact of poverty^A (IQR)	2 (2-3)	2 (2-3)	2 (2-3)	0.609

^AGreater score indicates greater impact: 1=no impact, 2=minimal impact, 3=moderate impact, 4=significant impact.

Pre-departure ethics trainings are not well tailored to fieldwork in LMIC

Seventy-six percent of respondents received some sort of ethics training and most participated in more than one form of training: 45.1% attended pre-departure sessions, 41.0% completed online ethics trainings and 39.3% attended a course that

discussed research ethics (Table 8). Respondents were much less likely to report that university-sponsored ethics trainings were “very helpful” (19.4%) compared to communication with other students (76.3% “very helpful”) and courses (65.3% “very helpful”, Figure 1). Those who rated ethics trainings as very helpful were more likely to feel well prepared for ethical challenges than those who rated them as not helpful or minimally helpful (66.7% vs 33.3%, $p=0.015$).

Table 8. Types and helpfulness of ethics support

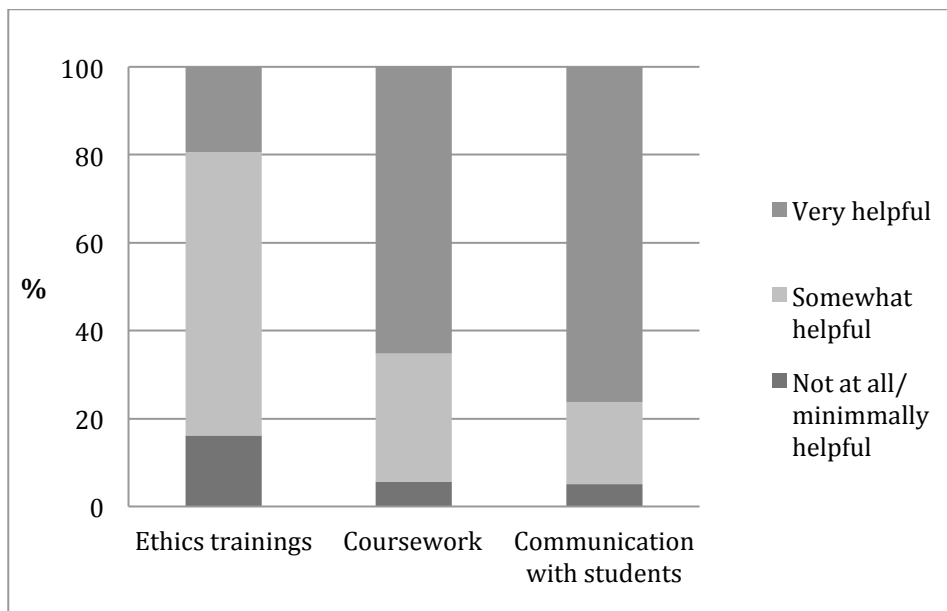
	Total n=123 (%)	Unprepared for ethical dilemmas (n=78)	Well prepared for ethical dilemmas (n=45)	P- value
Received ethics training				0.235
Yes	93 (76.2)	56 (60.2)	37 (39.8)	
No	29 (23.8)	21 (72.4)	8 (27.6)	
Types of ethics training (may report > one)				
Pre-departure session (e.g. fellowship-sponsored)				0.788
Yes	55 (45.1)	34 (61.8)	21 (38.2)	
No	67 (54.9)	43 (64.2)	24 (35.8)	
Online (e.g. IRB trainings)				0.012
Yes	50 (41.0)	25 (50.0)	25 (50.0)	
No	72 (59.0)	52 (72.2)	20 (27.8)	
Course-based (e.g. including research ethics)				0.099
Yes	48 (39.3)	26 (54.2)	22 (45.8)	
No	74 (60.7)	51 (68.9)	23 (31.1)	
Helpfulness of ethics training in planning or implementing project				0.015
Not helpful/Somewhat helpful	75 (80.6)	50 (66.7)	25 (33.3)	
Very helpful	18 (19.4)	6 (33.3)	12 (66.7)	
Took coursework relevant to project				0.017
Yes	72 (59.5)	39 (54.2)	33 (45.8)	
No	49 (40.5)	37 (75.5)	12 (24.5)	
Helpfulness of coursework in planning or implementing project				0.135
Not helpful/Somewhat helpful	25 (34.7)	17 (68.0)	8 (32.0)	
Very helpful	47 (65.3)	22 (46.8)	25 (53.2)	
Communicated with students who visited host site previously				0.576
Yes	59 (48.0)	40 (67.8)	19 (32.2)	
No	29 (23.6)	18 (62.1)	11 (37.9)	
No students had visited previously	35 (28.5)	20 (57.1)	15 (42.9)	
Helpfulness of communication with students in planning or implementing project				0.514
Not helpful/Somewhat helpful	14 (23.7)	8 (57.1)	6 (42.9)	
Very helpful	45 (76.3)	32 (71.1)	13 (28.9)	

Host advisor was enthusiastic about project				0.396
Disagree or neither agree nor disagree	27 (22.0)	19 (70.4)	8 (29.6)	
Agree or strongly agree	96 (78.0)	59 (61.5)	37 (38.5)	
Home institution advisor was enthusiastic about project				0.095
Disagree or neither agree nor disagree	29 (24.0)	22 (75.9)	7 (24.1)	
Agree or strongly agree	92 (76.0)	54 (58.7)	38 (41.3)	
Frequency of student-advisor communication before fieldwork (median score^A, (IQR))				
Host advisor	2 (1)	2 (1)	2.5 (1)	0.026
Home institution advisor	3 (2)	3 (2)	3 (2)	0.392
Frequency of student-advisor communication during fieldwork (median score^A, (IQR))				
Host advisor	5 (2)	5 (2)	5 (1)	0.357
Home institution advisor	2 (2)	2 (3)	2 (1)	0.962
Support in dealing with ethical dilemmas from home or host advisors/institution				0.010
No/Minimal support	46 (38.3)	36 (78.3)	10 (21.7)	
Moderate support	43 (35.8)	25 (58.1)	18 (41.9)	
Significant support	31 (25.8)	14 (45.2)	17 (54.8)	
Total support for addressing culture, poverty and ethics (median total score^B, IQR)	9 (6-10)	8 (6-9)	9 (7-11)	0.005

^AGreater score indicates more frequent communication on a scale from 1 (never communicated with advisor) to 5 (communicated several times a week).

^BGreater score indicates greater total support, calculated as sum of scores for support for dealing with culture, poverty and ethics, from minimum of 3, indicating no support across three areas (i.e. score of 1 for each of the 3 areas) to a maximum score of 12, indicating the greatest level of support across all through areas (i.e. score of 4 for each of the 3 areas).

Figure 1. Helpfulness of trainings, coursework and communication with students in preparation for research



In write-in questions, many respondents stated that pre-departure ethics trainings served as an introduction to research ethics and were helpful in developing an IRB protocol. However, many felt trainings were not well matched to actual experiences in the field. One respondent stated the biggest challenge he faced were the “unknown unknowns,” which were especially salient given that training and fieldwork took place in different countries. Several respondents pointed out this discrepancy and the problems that arise from it:

Ethics work very differently in other countries, so sometimes it was difficult to separate what was acceptable in the country and what was ethical as students from an American university. [F, UG]

It is very broad and it is very difficult to take information learnt [in the U.S.], in an environment that makes the information relayed seem obvious, to a new and vastly different environment that is not predictable. [F, UG]

The training laid the ground rules for what is "okay" and what is "not okay," but it was not comprehensive in giving real life ethically complicated situations. Therefore, on the ground I had to use my own judgment with several scenarios. [F, UG]

Many respondents described specific content that they felt pre-departure training should have addressed, such as working with IRBs in other countries, research with vulnerable populations, and ethical challenges that are common in global health research:

It didn't cover a lot of the challenging situations that arise when working with illiterate and uneducated populations as an outsider, and when these arose, I often still felt unsure. [F, UG]

I was working with a vulnerable population (sex workers) in a country that detains that group in mandatory rehabilitation centers. It would have been nice to get more ethics training specific to my situation. [F, GR]

I think perhaps discussing some potential difficulties you could have with ensuring proper ethical practices while in a foreign country would be useful. For

example, confidentiality can be very difficult to ensure depending on the study site. [F, UG]

Respondents found those trainings that included prior student experiences and case-based learning to be helpful:

The pre-departure training provided us with some examples of ethical dilemmas that previous students had experienced. Many of these situations were things I hadn't thought about prior to the training. [F, GR]

The most helpful part of the training was discussing scenarios and talking about what we would do if those scenarios came up. [F, UG]

Coursework is helpful for both study design and ethics

Sixty percent of respondents had taken courses relevant to their global health fieldwork. Most of those who took courses felt they were “very helpful” (64.0%) in preparation and implementation. In write-in responses most reported that courses helped with study design and analysis, and those who had taken a global health research ethics course reported that their coursework helped with ethical challenges. Those who took a relevant course were also more likely to report feeling well prepared to address ethical challenges (45.8%) than those who did not take a relevant course (24.5%, $p=0.017$, Table 8).

There were several sessions on ethical concerns that were interesting, helped me frame my research in a bigger picture, and influenced some choices I made at my site. [M, GR]

Mentorship at host and home institutions is important but sometimes lacking

Most respondents (61.6%) reported receiving significant or moderate assistance from their home or host institution advisors in addressing ethical dilemmas.

Many described their advisors as the most helpful person or resource, but struggled to find such mentors:

Individual faculty mentors were by far the most helpful. [The university] could have provided some sort of way to more easily identify faculty and graduate students across all of the different schools that shared similar interests and research questions. [M, UG]

Those who reported greater support from host and home advisors and institutions in the realms of ethics, resource differentials and cultural differences were more likely to feel well prepared to address ethical challenges (mean total support score 8 vs. 9, $p = 0.005$; maximum support score 12, minimum score 4, Table 8). Respondents who felt more prepared to deal with ethical challenges reported communicating more frequently with their host site advisors prior to initiating their fieldwork, compared with those who felt less prepared (median 2.5 vs 2, $p=0.026$; 2=one communication/month or less, 3=2-3 communications/month, Table 8). There were no differences in frequency of communication with home institution advisors. Many respondents felt that their projects would have benefited from more frequent communication with host advisors:

I could have better prepared for my project by having far more contact with my host preceptor and ironing out the details of my activities there beforehand. [M, GR]

Specifically, some respondents felt that faculty advisors should provide individualized mentorship in attending to ethical challenges, to compliment ethics trainings:

[The ethics trainings provided] general information... a good framework for thinking about ethical issues that may arise in global health research. Every research experience is different however, and experience or being able to [talk] with mentors while you are working through ethical considerations are most helpful. [F, GR]

I think sometimes ethics training is a bit too broad. A specific one-on-one meeting about our research and the problems we'd come up against would have been helpful. [M, UG]

Peer communication provides project-specific support

Many respondents (47.2%) communicated with students who had previously been to the same host site, of whom 76.7% found this communication “very helpful.” Survey responses indicated that experienced classmates helped orient to cultural issues, frame expectations, and shared challenges they’d faced:

[Communication with other students] gave me an idea about what to expect in terms of challenges I might face while onsite. [F, GR]

[Students who’d been there previously] spent an entire semester preparing us... They gave us insight into what types of projects were feasible as well as the types of challenges we would come up against. We couldn't have made our project happen without them. [M, UG]

Experienced students were able to advise regarding specific ethical challenges described by many respondents, such as consent procedures with low-literacy populations and culturally appropriate data collection:

[They] gave suggestions about how to communicate with participants, gave information about the site, gave cultural insights. [F, GR]

They had been there before and so know they knew how to ask questions appropriately to community members. [M, UG]

Some respondents traveled to the host site with other students, providing a forum for discussion of specific ethical challenges as they arose:

The biggest ethical challenge for us was obtaining truly informed consent from research participants who were illiterate or semi-literate and who had never heard of a research project before... My research team had many group meetings to discuss how best to deal with this situation, and I do think that overall we erred

on the side of caution and took the time to really explain what we were doing to our participants. [F, UG]

Working with collaborative teams is always best I think. It would have been impossible to deal with many challenges alone. [M, UG]

The majority (86.0%, data not shown) of respondents believed communicating throughout their fieldwork with a peer mentor with research experience in the country would have benefited their project. Some suggested specific formats in which such relationships could be facilitated, including social networks and in-person forums and mentoring relationships:

Have forums for students planning to go do research to speak with students who previously conducted research abroad to discuss challenges and situations they could potentially come across. [F, UG]

Having an assigned student mentor who had conducted research in that country would have been invaluable... I think this would be a great way to add value to the process and leverage all that hard-won experience at the student level. [M, GR]

Post-research debriefing may help process experiences

Most respondents (73.6%) believed that debriefing sessions after their research experience would have benefited them. Some respondents had participated in a fellowship that provided a debriefing session:

The post-fellowship ethics workshop was also incredibly helpful in digesting my experiences as a first time independent researcher. [F, GR]

[The university should host] a global health showcase or conference in the fall so students are required to discuss their results and challenges. [F, UG]

Graduate students are more prepared for ethical challenges

Compared with undergraduates, graduate/professional students were significantly more likely to have received ethics training prior to their fieldwork (91.5% vs 61.9%, $p < 0.001$, data not shown in table format) and to have taken relevant coursework (79.7% vs 40.3%, $p < 0.001$). Graduate students communicated significantly more frequently with their home advisors before and during their research (median 2-3 times per month vs. median once per month or less for undergraduates both before and during), and reported greater support from advisors in dealing with ethical challenges ($p = 0.024$). Overall, graduate students reported more support ($p = 0.002$) and better preparation ($p = 0.012$) than undergraduates for ethical, cultural, and poverty-related challenges.

Discussion

To our knowledge, this is among the first studies to report students' experiences of ethical challenges in global health research. Respondents report challenges in human subjects protection, questioned the ethics of research that did not benefit local populations, addressed corruption and bribes, and managed challenges to working within the boundaries of their levels of training. These experiences were influenced by the low-resource settings in which they worked as well as their status as students.

Many of our respondents described a disconnect between research ethics as described and applied in the U.S., and the ethical challenges they confronted at their research sites. This is reflected in the literature on global health research ethics. Broader definitions of research ethics have been suggested for global health research, which may help better connect expectations to reality in low-resource contexts. In particular, proposed definitions address process (e.g. partnership, capacity-building) and outcomes (e.g. social value, solidarity, innovation).^{4,34,35} While some of our respondents grappled with a lack of research benefits to host communities, a more thorough discussion of global health inequities and principles may prepare students to better recognize and address these global health specific ethical challenges. We also identified specific limitations in student experiences and resources that may intensify ethical challenges. Pinto and Upshar⁴ have described principles of global health ethics for students to address these limitations and challenges. Specifically, they suggest students practice humility to recognize their own limitations, utilize introspection to identify motivations, personal privilege and social inequities, and work in solidarity

with communities. Students should be exposed to these principles and global health specific ethical frameworks before embarking on research in LMIC. Our study finds varied and important ethical breaches and dilemmas that should be further explored by future studies from host and faculty perspectives.

For many students, undergraduate or graduate research may be their first global health experience. As a formative experience during training, the depth of ethics preparation, breadth of support and mentorship, and types of responses to ethical challenges may determine how students address global health ethics and inequities throughout their careers. Undergraduate students, who in our study reported less research training and fewer opportunities for mentorship than graduate students, may find it especially difficult to navigate ethical challenges.

This study points to a variety of ways that students are assisted in dealing with the complex ethics of global health research, as well as a number of deficits. Respondents reported variable support for ethical challenges from their advisors, institutions and peers. Those who communicated more frequently with advisors and took relevant coursework felt more prepared for ethical challenges; meanwhile, those who reported ethical challenges were less likely to feel prepared for those very challenges. While less preparation or advising may have meant students had less support or knowledge to avoid ethical challenges, these findings may also be explained by a critical self-reflection on the part of students—in the face of unexpected challenges, respondents may retrospectively judge their preparation and support as insufficient. Those who did not experience an ethical challenge may have

believed – correctly or incorrectly – that their preparation was adequate. Either scenario highlights the need for additional preparation, support and mentoring.

Those respondents who had strong mentorship found those relationships to be instrumental in implementing their research and addressing ethical challenges. Many respondents received guidance around study design, implementation and ethics via strong faculty advising relationships, but many others reported difficulty in starting and cultivating such relationships. Universities could help students identify advisors through networking, and could foster strong mentoring relationships by providing guidance to both mentor and mentee about common best practices for both roles.³⁶ To ensure adequate faculty mentorship, universities will have to address burdens on advisors, such as by dedicating time or percent effort to research mentorship, and capping the number of mentees per professor. Taking this a step further, universities may require undergraduates to work only under direct faculty supervision or at pre-approved sites.

In addition to faculty advisors, host advisors and colleagues were important sources of advice and support for many respondents. However, some found that host advisors were not as readily available as they had expected. Some compensated for this by forging alternative advising relationships once at the host site. Universities and home institution advisors can help ensure strong advisor-student relationships with hosts by requiring communication throughout the process, and through building mutually beneficial institutional relationships, as proposed in the WEIGHT guidelines. Hosts often have competing clinical, research and administrative responsibilities, while being expected to spend time and resources with visiting

students. These burdens should be recognized, mitigated when possible and compensated appropriately. Clear responsibilities for students at the host site may also improve host-student relationships and ensure mutually satisfactory experience. Our respondents described many instances in which they were asked by host advisors to participate in activities they felt were beyond their level of training. This may reflect an expectation on the part of hosts that the students will contribute and assist in clinical or organizational activities which are often overburdened. To better address conflicts around student scope of practice and both student and host responsibilities, future studies should seek the perspectives of host advisors and staff regarding burdens and benefits of visiting students.

Our results indicate that another helpful source of ongoing support are other students. Communication with students who had previously been to the site helped many respondents to develop feasible objectives and protocols, set expectations, and recognize potential ethical challenges beforehand. Students may benefit in particular from working with “near peers”– trainees who are a step or two further along in their training, who can offer advice or serve as supervisors. To promote peer networks and support, universities could facilitate contact between students and other students, alumni and faculty who have relevant experience in the same location or country. Experienced peers may also contribute to pre-departure trainings and post-experience debriefing, which has been successfully implemented and described elsewhere.²⁵ Team-based research, including students of different disciplines and training levels, provided some of our respondents with important forums for discussing and

addressing ethical challenges. Universities and other funding institutions can promote group work by earmarking funding for multi-student projects.

Our findings indicate that pre-departure preparation is variable, and in many cases not relevant to the realities of LMIC research settings. Respondents desire discussion of relevant ethical standards and challenges, and many suggested that peers might discuss their experiences working in similar settings. Pre-departure preparation should also include discussion of how to address ethical challenges when they arise. Many of our respondents were unaware of whom to contact, or unsure of how to respond when an advisor was not readily available. By helping students to develop a practical plan ahead of time, ethical challenges may be addressed in more appropriate and timely ways when they arise, and lead to better learning outcomes for students.

The perceived inadequacy of pre-departure trainings among our respondents may also be due to the limited time dedicated to these trainings, often just one or two hours. Among our respondents, a subset of graduate students who participated in a competitive global health fellowship reported satisfaction with their semester-long preparation which included proposal-writing workshops, global health ethics trainings, structured mentorship and post-fellowship debriefing. Still other respondents had taken a global health-specific course focusing on both methods and ethics which they reported was very helpful in preparing for and carrying out research in LMIC. To adequately address the multitude of ethical and practical challenges of global health research, many institutions have implemented semester- or year-long global health fieldwork courses that address ethics, research design, health inequities,

travel safety, among other topics.^{9,24,25} Many of our respondents had not attended any pre-departure training, either because they were not offered or were not required. Just as North American medical schools are moving toward requiring pre-departure training for all clinical global health electives,¹⁹ universities might consider pre-departure training or relevant coursework as a prerequisite for funding for global health research.

Models and resources exist for universities to adapt to specific programs and needs. The online global health ethics case-based training developed by DeCamp et al., for example, discusses issues relevant both clinical and research activities, such as cultural understanding, exceeding level of training, and recognizing burdens.³⁷ Published cases can be developed into classroom or online activities, as the American Medical Student Association has done with the global health ethics cases written by Provenzano et al.^{38,39} Simulation has been proposed as another case-based method that may allow learners to recognize and practice addressing ethical challenges.⁴⁰ Students with prior fieldwork experience could participate in trainings by providing real-life cases and an opportunity for near-peer learning. Our findings indicate that respondents prefer case-based ethics training, but additional evaluation of such initiatives to identify best practices in global health support is needed to help guide program development.

This study has several limitations. Its retrospective, cross-sectional design may contribute to recall bias and limits the conclusions that can be drawn from the findings. However, both in the significant write-in responses and in one-on-one interviews presented elsewhere, respondents had no trouble recalling their

experiences in great detail. Spending weeks or months in a very different environment conducting challenging fieldwork are significant experiences for most students that are not readily forgotten. However, in part because of the significance of these experiences, those respondents with particularly good or bad experiences may have been more likely to participate, thus increasing outlier experiences amongst the results. As described in the methods, some respondents were not engaged in formal research, however they faced similar ethical challenges in carrying out fieldwork as those students conducting research. As we have not limited our definition of ethics to the procedures and standards of human subjects protection, the experiences of all respondents are relevant to our study aims. Finally, while the respondents are all from a single university, which may limit the generalizability of our findings, there are no institution-wide guidelines for preparation or support. Experiences varied greatly between disciplines and professional schools, and by level of training and funding mechanism, and thus we believe our findings reflect the range of global health experiences common at many universities.

Conclusion

As interest in global health increases amongst students, best practices in preparation and support for trainee experiences must be identified, for both educational and ethical reasons. To best mitigate the inequities that currently define global health practice, we must train future practitioners to recognize and address the ethical challenges inherent in global health fieldwork. To do so, future research should define ethical challenges and solutions from the perspectives of both hosts and visiting students. Evaluate of global health training and support is needed to define the content, pedagogy and strategies that will best help trainees develop into champions of equity and ethics in global health.

Specific recommendations

1. Additional research is needed to describe ethical challenges in global health research from student, faculty and host perspectives.
2. Universities should enhance the preparation of students for the ethical challenges in global health research:
 - a. Require preparation prior to research that is global-health specific, including case-based ethics training and peer support.
 - b. Implement additional requirements or limitations for undergraduates to ensure appropriate scope of activities and oversight, e.g. only fund or give credit to students who participate in faculty research or go to pre-approved sites, and prohibit or strongly discourage students from working with certain very vulnerable populations (e.g. sex workers)

- c. Increase access to global health ethics courses.
 - d. Establish peer networks to link students to experienced students and faculty.
3. Universities should support effective student mentorship and mutually beneficial partnerships between sending and host sites:
- a. Require faculty oversight of student research.
 - b. Promote strong mentoring relationships and dedicate faculty time and compensation for mentoring.
 - c. Identify host responsibilities and benefits, and provide fair compensation for time and resources devoted to visiting students.

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