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Cultural Adaptation of a Medication Adherence Intervention with Prisoners Living with HIV in Indonesia: A Pragmatic Approach to Intervention Development

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Abstract

Cultural adaptation is a research strategy used to tailor evidence-informed interventions for new populations and settings. We describe a pragmatic approach used to culturally adapt a nurse-led medication adherence intervention, Adherence Through Home Education and Nursing Assessment (ATHENA), for prisoners living with HIV in Indonesia. Researchers reviewed data from completed studies in Indonesia and identified core components of the ATHENA intervention considered essential for effectiveness. Adaptations likely to render ATHENA acceptable and feasible in the Indonesian prison setting were proposed. An intervention led by nurses and peer educators was feasible and congruent with existing models in Indonesian prisons. Involving prisoners with HIV in successive developmental phases helped to ensure a good cultural fit. In the context of prisons and other freedom-limiting environments, a pragmatic approach that integrates members of the target population within an anti-oppressive Freirian pedagogical framework is highly appropriate for adapting evidence-informed interventions.

Keywords

cultural adaptation; HIV; Indonesia; medication adherence; prisoners

Cultural adaptation is a research strategy used to tailor evidence-informed interventions for new populations and settings while retaining the core components that make the intervention effective (Castro, Barrera, & Steiker, 2010; Chen, Reid, Parker, & Pillemer, 2013; Wingood

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& DiClemente, 2008). The purpose of cultural adaptation is to speed the dissemination of effective interventions by first ensuring that an intervention fits with the needs, expectations, and cultural norms of the target population. Interventions that result from cultural adaptation are not replications but essentially new evidence-informed interventions. Although the need for cultural adaptation is widely acknowledged, few organized or practical approaches have been developed. Most approaches involve an initial assessment phase to identify the needs of the target population, followed by an adaptation phase where some components of the intervention are modified to make it feasible, locally relevant, and acceptable in the new population and setting (Castro et al., 2010). Less discussed, although equally important, is how to disentangle the core components of an intervention from those that may be culturally adapted without compromising previously tested elements of the intervention (Castro, Barrera, & Martinez, 2004).

In the case of HIV prevention and management, a great deal of new scientific evidence has emerged since many interventions were first developed. Cultural adaptation is necessary to consider how these evolving scientific paradigms, notably treatment as prevention and treatment for all, impact intervention design and delivery. In this paper, we describe a practical approach that was used to culturally adapt an antiretroviral therapy (ART) adherence intervention, developed first in the northeastern United States, Project ATHENA, for male prisoners living with HIV infection in Indonesia. Adaptations that emerged from this process and the final study design for a pilot randomized controlled trial of the adapted intervention are also discussed. Cultural adaptation is crucial because, in groups where ART adherence is most problematic, such as with people who inject drugs (PWID) or released prisoners, unique social-contextual factors, such as drug use criminalization and stigma, markedly influence adherence behaviors and need to be considered as interventions are planned and implemented locally.

A Nursing Intervention to Improve ART Adherence

Although many high-quality evidence-informed interventions for HIV risk reduction are available, relatively few medication adherence interventions have been developed or meet rigorous criteria for best evidence (Centers for Disease Control and Prevention, 2017). Adherence Through Home Education and Nursing Assessment (ATHENA), is an evidence-informed ART adherence intervention delivered in the patient's home by nurses and peer educators working in teams. ATHENA combines two distinct but well-matched approaches to clinical care: (a) home visits based on a community nursing model, and (b) health education based on a Freirian education model (Williams et al., 2005). Effectiveness of the ATHENA intervention was first established in clinical trials conducted in the United States (Williams et al., 2006), and subsequently with modifications in China (Wang et al., 2010).

An important aspect of ATHENA that distinguishes it from other medication adherence interventions and underpins its effectiveness is the home visit, which is premised on the idea that health care providers must enter the patient's social environment to intervene effectively (Williams et al., 2005). The focus of home visits is on fostering a respectful dialogue with the patient to identify and address patient-identified factors or themes that adversely affect ART adherence. Home care models, such as ATHENA, that use nurses to manage ART have

been very effective for improving access to HIV treatment (Govindasamy et al., 2014; Kredo, Adeniyi, Bateganya, & Pienaar, 2014). Interventions delivered by nurses and/or peer educators outside clinical settings may be useful, especially as a means to address social-structural barriers to HIV prevention in highly stigmatized groups (Ti & Kerr, 2013), including PWID and prisoners.

The Adaptation Context: HIV and Substance Use in an Overcrowded Prison

In countries where drug use is criminalized and fuels the HIV epidemic, prisons have become a focal point for interventions to increase ART coverage (Dolan et al., 2016). In prison, adherence to ART is usually adequate to achieve viral suppression, but adherence drops sharply after prison release (Iroh, Mayo, & Nijhawan, 2015). Effective adherence training immediately before and after prison release may improve health outcomes and limit transmission. Yet few studies have rigorously evaluated the effectiveness of ART adherence interventions that begin in prison and follow patients after release into the community (Kouyoumdjian et al., 2015).

Indonesia is a lower middle-income country prototypical in many ways of global regions where HIV and substance use intersect in the criminal justice system. In Indonesia, HIV prevalence in prisons is several-fold higher than in the community, and most prisoners (~70%) use drugs (Dorimulu & Purnamsari, 2013). The opportunities to intervene in prisons to improve engagement in HIV care have not gone unnoticed. Although many prisons in Indonesia still lack adequate numbers of skilled staff (Parlina & Somba, 2016), a national policy adopted in 2005 expands HIV testing and treatment for prisoners, such that most prisoners living with HIV are first diagnosed and offered treatment in prisons (Culbert et al., 2016). For prisoners initiating ART in prison, a number of adherence supports exist, including assessment and monitoring by nurses and physicians, peer support, and directly observed therapy. Prisoners meeting criteria for opioid dependence may also receive methadone, which, when dosed correctly, promotes ART adherence in PWID (Lappalainen et al., 2015). ART and methadone are both available in the community and fully subsidized by the Indonesian government under universal health care.

Prisons are also risk environments - social and physical settings in which factors exogenous to the individual interact to amplify harms associated with HIV and substance use (Rhodes, 2009). Overcrowding and inadequate sanitation increase the risk that persons living with HIV (PLWH) in prison, many of whom present with advanced HIV, will be exposed to tuberculosis and other opportunistic illnesses. Rigid social hierarchies, HIV stigma, and lack of privacy for ART in prison can increase the threat of violence such that some PLWH choose to conceal their HIV status or refuse treatment rather than risk being ostracized (Culbert, 2014). In Indonesia, overcrowding has also contributed to the rise of a prison subculture in which drug use is normalized, and methadone and ART are stigmatized (Culbert et al., 2016; Culbert, Earnshaw, et al., 2015). The risk environment concept also usefully applies to community reentry, when multiple disabling factors, including diminished social capital, homelessness, and inadequate addiction treatment interact to increase the risk of ART non-adherence (Milloy et al., 2011) and death after prison release (Zlodre & Fazel, 2012).

Objectives

Our purpose was to describe the rationale and process used to adapt an evidence-informed medication adherence intervention, ATHENA, cross-culturally for the Indonesian prison context, and the steps taken to ensure fidelity to the original intervention. We discuss how the intervention was updated to incorporate current HIV treatment guidelines, and offer recommendations that could usefully inform future work. The following cultural adaptation questions guided this project: (a) what were researchers looking for in an intervention, and why was ATHENA selected? (b) what adaptations were required to make ATHENA culturally acceptable and workable in the prison setting? and (c) how did researchers maintain fidelity to the original intervention throughout the adaptation process and ensure that the adapted intervention was consistent with current HIV treatment guidelines? To answer these questions, we drew on our completed studies, which have generated key insights into HIV prevention and treatment with prisoners in Indonesia and laid the groundwork for cultural adaptation of nursing interventions. We describe the activities and findings of our work in Phases 1 and 2 as that work related to the challenge of adaptation. A pilot randomized controlled trial of the adapted intervention (Phase 3) is currently underway in Indonesia, with 120 prisoners living with HIV enrolled.

Methods

A Pragmatic Approach to Cultural Adaptation

Our approach to cultural adaptation borrowed from previously successful models (Wingood & DiClemente, 2008) and was influenced by rapid ethnographic appraisal, a research method characterized by intensive fieldwork and use of multiple data sources and methods (Scrimshaw, Carballo, Ramos, & Blair, 1991). Rapid ethnographic appraisal is considered especially effective for linking assessment to development of culturally appropriate interventions, because it promotes an investigative orientation and permits an analysis of how health problems are influenced at the individual, community, and structural levels (Stimson et al., 2006).

This cultural adaptation framework (Table 1) organizes research activities into assessment, adaptation, and pilot phases. Phase 1 (*Assessment*) establishes the need for an intervention, and produces preliminary data to select an intervention and identify potential mismatches (Castro et al., 2010). Phase 1 includes steps to ensure diversity of the research team, generate research questions, set limits on data collection, and identify intervention targets (i.e., what the intervention should achieve) and cultural norms that may influence individual behaviors. Phase 2 (*Adaptation*) includes steps to select an intervention, identify the core components, and propose adaptations that will ensure a good cultural fit with the new population. Phase 3 (*Pilot*) provides additional information about the demand for the intervention and factors that could alter the effectiveness of the intervention in a different context. As stated previously, we describe the activities and findings of our work in Phases 1 and 2 in this paper.

Initial Assessment Approach

The purpose of our formative assessment was to generate evidence about the scope of the problem – ART non-adherence in PLWH transitioning from prison to the community – and to identify factors associated with non-adherence, and sub-groups of PLWH in which ART adherence might be especially problematic. To achieve these aims, a mixed method approach with cross-sectional and longitudinal components was considered optimal. Mixed methods were employed to permit quantification of key HIV-related health outcomes, including ART adherence, and to qualitatively explore social contextual factors influencing these same outcomes. The research team generated a limited set of initial questions while maintaining flexibility to investigate topics, including potentially sensitive topics such as in-prison drug use, that emerged during interviews as influencing ART adherence. A longitudinal approach was used to better understand how ART adherence changed after prison release.

Research Team

At the outset, we established an interprofessional research team that included cultural insiders (people familiar with the Indonesian language, culture, and especially the prison and drug injection sub-cultures) and cultural outsiders (individuals with extensive clinical and research training, but less familiar with the everyday lives of participants). Teamwork is an essential part of the cultural adaptation process, especially during the initial assessment phase, because it enables researchers to maintain awareness of their own cultural assumptions and how their roles in the research may have influenced findings or interpretations of the data.

Data Sources

Prior to selecting an intervention, our team completed four studies within the target population (Table 2), including mixed-method analyses of in-prison drug injection (Culbert, Waluyo, et al., 2015), HIV stigma (Culbert, Earnshaw, et al., 2015), ART use and treatment attitudes (Culbert et al., 2016), and a survival analysis (Culbert et al., 2017). These analyses were based on an observational cohort of 102 prisoners with HIV infection recruited from November 2013 to April 2014 from two prisons in Jakarta, and followed for 2 years until study completion. Data were also available from family members and caretakers of PLWH recently released from prison ($N = 24$), who provided information about caregiver strain and feasibility of home care. Other groups of stakeholders included PLWH trained as peer educators, corrections authorities, and HIV service providers, who we consulted during the data analytic phase to validate initial interpretations and to guide intervention selection and adaptation.

Ethics Statement

Study protocols were approved by institutional review boards at Yale University, The University of Illinois at Chicago, and the University of Indonesia. Permission for the study was provided by the Indonesian Ministry of Research and Technology and Directorate General of Corrections, Ministry of Law and Human Rights. Participation was voluntary and subjects were selected equitably without prison staff involvement. All prisoner subjects provided written informed consent in prison and again after release.

Data Collection

Data collection and analytic procedures for our completed studies have been described in detail elsewhere (Culbert et al., 2016). Briefly, study participants were randomly selected from a de-identified list of all prisoners with an HIV diagnosis at each prison site stratified by CD4⁺ T-cell count (< 200 cells/ μ L, 200-350 cells/ μ L, 350-500 cells/ μ L, and > 500 cells/ μ L) and ART use (*yes* or *no*). Participants were interviewed in prison by trained research staff using a structured interview guide, and completed questionnaires about HIV stigma, treatment beliefs, and substance use. A one-time follow-up survey was conducted in the community with participants who were released from prison during the 2-year study period, the purpose of which was to assess ART adherence and mortality after prison release (Culbert et al., 2017). Follow-up surveys were mainly conducted in the participants' homes, although a few were conducted in mosques, on the street, or by phone.

Prior to visiting participants in their homes, researchers asked them to identify a family or household member who was supportive and involved in their care and who could be interviewed. Researchers conducted brief, semi-structured interviews with family members and caretakers to explore whether and how to include family members in the intervention. Interviews focused on social support, HIV stigma, caregiver strain, and expectations for home care. Researchers attempted to interview at least one family member per participant. Family members of participants who remained in prison, died, or were lost to follow-up were not interviewed except to determine date and cause of death or last known address. Key findings from interviews with family members were recorded immediately after the interviews in contact summaries.

Data Analysis

For the purposes of choosing and adapting an evidence-informed intervention, data gathered from the sources described above were reviewed by members of the research team and discussed with a diverse group of stakeholders including corrections authorities, peer educators (PLWH who received additional training to assist health care staff in prison), clinicians working in prison and community settings, and other individuals with significant experience delivering health services to the target population. The format of these discussions, or member checks, varied depending on the stakeholder group, but the purpose was invariably to openly present the results of our formative assessment, validate researcher initial interpretations, and elicit constructive feedback, which was recorded and organized in field notes.

Equipped with these additional insights, researchers reviewed the Centers for Disease Control and Prevention compendium of evidence-based medication adherence interventions (www.cdc.gov/hiv/prevention/research/compendium/index), and selected ATHENA, which team members agreed provided a good initial fit with the population. In collaboration with the original developers of ATHENA, researchers reexamined previous studies of ATHENA (Wang et al., 2010; Williams et al., 2005; Williams et al., 2006; Williams, Wang, Burgess, Li, & Danvers, 2013), identified core components of the intervention, which were considered essential for effectiveness and non-modifiable, noted cultural mismatches between the original context and the adaptation context, and proposed an initial set of

adaptations that were likely to render ATHENA acceptable and feasible in the new population and setting. We also reviewed international guidelines for managing advanced HIV disease and rapid ART initiation (World Health Organization, 2017) to identify key recommendations. In this paper, we present the results of stakeholder analyses and adaptation recommendations formulated by the working group.

Findings

Intervention Selection

ATHENA was initially selected as a platform for developing our intervention because of its emphasis on modifying social-contextual factors that influence ART adherence, which our formative assessment suggested were important targets for an intervention. Guiding intervention selection were the following three criteria specifying that the intervention could be:

- adapted to the context of prisons and community reentry,
- feasible within a resource-constrained setting such as Indonesia, and
- offered to any PLWH regardless of treatment history.

A nurse-led intervention was considered feasible because nurses in Indonesia were already trained for active roles in community health. Also, the use of peer educators was harmonious with existing peer support models in prisons in Indonesia. Having a team of care providers conduct home visits before and after prison release appealed as a potentially effective way to ensure continuity of care during the transition from prison to the community. Finally, the intervention offered flexibility to address patient-level barriers to starting ART in prison, which our formative assessment suggested was an important goal to increase ART use after prison release.

Core Components

Analysis of the original ATHENA studies revealed four essential components believed to underpin its effectiveness (Table 3). Core components were considered non-modifiable, with the provision that future work should continue the process of clarifying and refining the underlying mechanisms. For example, although home visits were a core component of the intervention, the working group allowed nurses flexibility to visit patients in close proximity to settings where patients lived and worked, so long as the focus remained on addressing adherence within the patient's immediate social environment.

Likewise, a Freirian approach to medication adherence, including participatory dialogue, was considered indispensable, although the working group acknowledged that themes and codifications would differ depending on the patient context. To uphold the effectiveness of the intervention, the working group agreed about the need to ensure the diversity of intervention teams, and maintain a focus on the three stages of listening, participatory dialogue, and praxis/action.

Adaptations

Three main adaptations emerged from the working group, each of which was thought to extend the intervention so that it would be more relevant, acceptable, and feasible in the new context, while maintaining fidelity to the underlying components.

Offer adherence support to all PLWH regardless of ART status—Revised HIV treatment guidelines recommend early ART initiation to all PLWH regardless of CD4⁺ T-cell count (Doherty, 2015). In previous ATHENA studies, the intervention was offered only to treatment-experienced PLWH who were motivated to improve their ART adherence (Wang et al., 2010; Williams et al., 2006). Our formative assessment suggested that a medication adherence intervention focused exclusively on patients already receiving ART would not benefit a majority of patients who did not receive ART in prison (56%-65%), either because the patient refused or delayed ART. Also guiding this adaptation was our finding that barriers to ART initiation and barriers to ART adherence were similar in the Indonesian prison setting, suggesting preliminarily that a medication adherence intervention might also provide a workable approach to address barriers to ART initiation. Further, peer educators and clinicians working in the prison felt strongly that any intervention for PLWH in the prison setting should be fair and equitable, meaning that clinical interventions should be offered to all PLWH regardless of individual treatment history.

Modify the intervention for the prison and reentry settings—Several factors unique to the physical and social environment of Indonesian prisons required consideration during intervention design. To adapt ATHENA to the prison setting, visits were conducted with small groups of patients (10-15 per group), who met once a month in the prison clinic, away from other prisoners. This adaptation built on existing peer support models within prison, helped to preserve patient confidentiality, and was consistent with the original Freirian framework, which emphasized learning through small group interactions. Prior to starting monthly group sessions, patients met with a project nurse who assessed their medication adherence and readiness for group work. To include patients with unstable living situations, the working group decided that post-release visits could be conducted in community locations where PLWH spent significant time and felt accepted and comfortable discussing their HIV treatments.

To address medication adherence barriers specific to the prison post-release context, the intervention was modified to incorporate elements of prison discharge planning. Discharge planning aimed to ensure patients received a 2-week supply of ART on their release dates, and developed a plan to establish care and access ART after prison release. Immediately prior to their release dates, patients met individually with an intervention nurse who helped them develop a prison discharge plan that included accessing medication, avoiding drug relapse, and scheduling the first home visit in the community. Because PLWH were enrolled in the pilot study regardless of their release dates, the number of visits in prison varied.

Formulate key HIV prevention messages—Generating themes through dialogue is central to empowerment health education and a core component of the ATHENA intervention. Our formative assessment identified six recurring topics or themes that

influenced ART adherence, including patient (a) religious beliefs about HIV, (b) misperceptions about the benefits of earlier treatment, (c) knowledge about ART as effective HIV prevention, (d) concerns about starting HIV treatment and especially mixing ART and methadone, (e) preparedness to advocate for treatment, and (f) disclosing HIV status and adherence needs with partners and significant others. To ensure that nurses and peer educators who delivered the intervention responded to these themes consistently and accurately, the working group tailored a set of “key messages” that included information about the benefits of earlier treatment and treatment as effective prevention (Table 4). To maintain fidelity to the original ATHENA intervention, which emphasized learning through dialogue, key messages were shared only when patients raised these issues, and were framed as reasons given by other patients rather than expert advice.

Discussion

Poor ART adherence is a primary barrier to achieving optimal HIV treatment outcomes in PLWH worldwide, yet few medication adherence interventions have been developed or culturally adapted for populations with the greatest need (Simoni et al., 2017). We described a pragmatic approach to culturally adapt a medication adherence intervention for a key population in Indonesia – criminal justice-involved PLWH - in which mortality remained extremely high (Culbert et al., 2017) - despite efforts to expand ART in prisons. In populations where ART adherence was especially problematic, including PWID and prisoners, unique social and cultural barriers may have contributed to suboptimal adherence and must be carefully factored into intervention designs. The steps taken in our study to adapt a medication adherence intervention cross culturally were innovative in several ways that may also be useful for adapting other types of interventions across cultures, geographic boundaries, and freedom-limiting settings (e.g., jails, mandatory drug detention centers, locked psychiatric facilities).

Although a number of useful cultural adaptation models have been proposed (Kumpfer, Magalhães, & Xie, 2017; Scrimshaw et al., 1991; Wingood & DiClemente, 2008), the framework described here delineated a crucial step, which was to identify the core components of an intervention that underpinned effectiveness and were non-modifiable. This overlooked step was necessary because behavior interventions often have multiple components that interact and it is not always clear which of these components can be modified without compromising effectiveness. Recognizing which components may be modified or eliminated altogether was especially important in settings where resources were limited. This step was also important to enhance scientific rigor, transparency, and reproducibility, and provided a way to understand mechanisms that contributed to success or failure in cases where adapted interventions were not ultimately effective.

HIV treatment guidelines now recommend that rapid ART initiation and intensified adherence interventions be offered to all PLWH presenting with advanced disease within the context of the treat all policy (World Health Organization, 2017). Yet the step from HIV testing to treatment remains one of high attrition, and late initiation of ART is still a persistent challenge in many low- and middle-income countries, including settings where ART is provided free of cost (Kiertiburanakul et al., 2014). Consequently, interventions that

decrease the time to ART initiation are required (Govindasamy et al., 2014), especially in prisons where many PLWH are diagnosed, often with advanced HIV, and first offered treatment. Our formative research in the Indonesian prison system where ART was available and many structural barriers to ART access were removed, suggested that patient misperceptions and negative attitudes about ART, which limit acceptance of ART, were similar in many respects to factors that interfere with ART adherence (Culbert et al., 2016). Medication adherence interventions provide a natural platform for developing a new class of interventions to increase ART coverage by supporting PLWH to initiate ART. Increasing ART coverage in prisons is an important public health goal, given that most prisoners return to the community and ART use in prison is an important determinant of ART use after release (Khawcharoenporn, Zawitz, Young, & Kessler, 2013).

A guiding principal of cultural adaptation is the need to work closely with members of the target population and stakeholders during early developmental stages to ensure that health services are culturally congruent and will be sustained (Castro & Yasui, 2017; Williams et al., 2013). Prisons are challenging settings in which to develop HIV-related interventions. Trust, confidentiality, and fairness, which are essential components of HIV care, are more difficult to establish in prison settings (Azbel et al., 2016), and interventions developed without involving prisoners are likely to be rejected on the grounds that they serve only the interests of prison staff.

Conclusion

Using cultural adaptation, researchers can efficiently tailor evidence-informed interventions for diverse patient populations while retaining the core components that underpin efficacy. Medication adherence interventions provide a useful framework for developing a new class of interventions to increase ART coverage. Differentiating core components from those that are adaptable, and updating interventions to reflect current science are essential aspects of cultural adaptation that are often overlooked. The importance of involving prisoners and prison staff in the early stages of intervention development cannot be overstated, especially as researchers develop interventions to improve the HIV treatment cascade for prisoners.

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Key Considerations

- Using cultural adaptation, researchers can tailor evidence-informed interventions for diverse patient populations while retaining the core components that underpin efficacy.
- Differentiating core components of an intervention from those that are adaptable, and updating interventions to reflect current science are essential aspects of cultural adaptation that are often overlooked.
- Successful cultural adaptation requires key affected populations and stakeholders to be involved in the early stages of intervention development.
- Medication adherence interventions can be successfully adapted to prisons and closed settings where many PLWH are first diagnosed and offered treatment.
- Medication adherence interventions provide a natural platform for developing a new class of interventions to expand ART coverage.

Table 1
A practical approach used to culturally adapt a medication adherence intervention (ATHENA) for HIV-positive prisoners in Indonesia

Activity	Rationale
Phase 1: Assess the population	Establish the need for an intervention and generate preliminary data about potential mismatches
1. Establish a culturally diverse and multiprofessional team	<ul style="list-style-type: none"> • ■ Ensure relevant expertise; bring diverse perspectives to the task of interpretation; maintain awareness of potential biases
2. Generate questions	<ul style="list-style-type: none"> • ■ Guide the formative assessment; establish endpoints for data collection
3. Gather qualitative data	<ul style="list-style-type: none"> • ■ Understand the significance of the behavior/problem and contributing factors from the perspective of the patient; identify themes
4. Collect quantitative data	<ul style="list-style-type: none"> • ■ Evaluate scope and factors associated with the problem; establish outcomes; identify variables that could influence intervention effectiveness
5. Analyze preliminary data	<ul style="list-style-type: none"> • ■ Identify intervention targets (i.e., sub-groups or behaviors); identify cultural norms/customary practices (e.g., HIV stigma) that influence target behaviors
6. Elicit feedback	<ul style="list-style-type: none"> • ■ Validate preliminary findings with stakeholders; detect bias in researchers' initial interpretations
Phase 2: Adapt the intervention	Ensure the adapted intervention provides a good cultural fit and conforms to best practices
1. Select an intervention	<ul style="list-style-type: none"> • ■ Establish a foundation for adaptation; decide what can be changed and what will not be changed; ensure that intervention can achieve the desired outcome
2. Identify core (non-modifiable) components	<ul style="list-style-type: none"> • ■ Maintain fidelity to the original intervention; check whether any core components are culturally incompatible
3. Identify modifiable components	<ul style="list-style-type: none"> • ■ Distinguish modifiable components that require adaptation from those that do not need to be adapted
4. Review applicable scientific evidence	<ul style="list-style-type: none"> • ■ Ensure that the intervention is robust to changes in evidence that emerged after an intervention was first developed, and remains relevant and applicable to the target population
5. Propose initial adaptations	<ul style="list-style-type: none"> • ■ Ensure that the intervention is relevant, feasible, and culturally acceptable; decide whether to modify content, design, or both
6. Draft an intervention manual	<ul style="list-style-type: none"> • ■ Ensure fidelity to the protocol; provide a basis for future adaptations
Phase 3: Pilot the intervention	Provide evidence about whether the adapted intervention is feasible and acceptable, or potentially alters the efficacy of the core components
1. Gather data about subject participation	<ul style="list-style-type: none"> • ■ Provide additional evidence about acceptability or demand for the adapted intervention; provide information about the optimal comparative effectiveness trial design
2. Evaluate fidelity to protocol	<ul style="list-style-type: none"> • ■ Provide information about implementation factors that could influence effectiveness
3. Analyze preliminary measures of efficacy	<ul style="list-style-type: none"> • ■ Provide information to guide selection of outcome measures for future trials (e.g., clinical relevance)

Activity	Rationale
4. Analyze lessons and revise intervention	<ul style="list-style-type: none">• ■ Identify successes and limitations in order to improve the intervention next time; ensure that successful adaptations and lessons learned are integrated into subsequent iterations

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Table 2
Completed studies with HIV-infected prisoners (*N* = 102, November 2013 to April 2014)

Source	Subject	Finding
Culbert, Earnshaw, et al., 2015	Within-prison drug injection	More than half (56%) of HIV-infected prisoners had a history of injecting drugs in prison. Substance use and stigmatization of prisoners receiving methadone were impediments to addiction and HIV treatment.
Culbert, Waluyo, et al., 2015	HIV stigma	Rigid social hierarchies and inadequate HIV treatment in prison perpetuated HIV stigma and factored importantly into patient decisions to start ART.
Culbert et al. 2016	ART utilization in prison	ART utilization falls substantially below recommended levels. Concerns about the safety, efficacy, and personal necessity of ART were reported by patients as reasons to defer ART.
Culbert et al., 2017	Mortality	HIV-related mortality was extremely high (125.2 deaths per 1,000 person-years). Inadequately treated HIV infection, often resulting in opportunistic infection, was the main risk factor for death.
Unpublished data	ART utilization post-release	More than half of released prisoners reported treatment interruptions, ART adherence < 85%, or not having seen an HIV care provider. Patients prescribed ART in prison were much more likely to use ART after release (UOR = 39.0, 95% CI 3.8-399.8, <i>p</i> = 0.002).

Note: ART = antiretroviral therapy; UOR = unadjusted odds ratio; CI = confidence interval.

Table 3
Core components of the ATHENA intervention identified through cultural adaptation

Core Component	Mechanism/Purpose
Home nursing visits	<ul style="list-style-type: none"> • ■ Assists with the identification of ART adherence barriers and facilitators in the patient's immediate social environment • ■ Provides opportunities to engage family members in medication adherence activities • ■ Contributes to the development of an equal exchange between the nurse and patient
Empowerment health education	<ul style="list-style-type: none"> • ■ Facilitates open-ended dialogue using techniques of active listening • ■ Learning occurs through participation in dialogue between equals • ■ Goal of learning is to identify root causes and propose action steps • ■ Patients define the content and outcomes of their own learning • ■ <i>Themes</i>: topics or issues that influence ART adherence, which are raised through a process of dialogue with the patient • ■ <i>Codifications</i>: representations of themes in form of drawings, music, or other media that highlight their universal nature
Intervention teams	<ul style="list-style-type: none"> • ■ Diverse group of nurses and peer educators working in teams • ■ Nurse's role is to perform clinical assessment and provide accurate information • ■ Peer educators are from the target population who provide a cultural bridge
Intervention process	<ul style="list-style-type: none"> • ■ Progression through 3 stages including listening, participatory dialogue, and praxis/action • ■ Establishing trust and building rapport facilitates an open dialogue with the patient

Note: ART = antiretroviral therapy; ATHENA = Adherence Through Home Education and Nursing Assessment.

Table 4
Key medication adherence and HIV prevention messages for the adapted ATHENA intervention

Theme	Key Message
1. Religious beliefs about HIV	<ul style="list-style-type: none"> • ■ Nobody chooses to have HIV, but you can choose treatment. • ■ God does not send a disease without also sending its treatment.
2. Benefits of earlier treatment	<ul style="list-style-type: none"> • ■ HIV is a lifelong illness, but is a treatable and manageable disease. • ■ People may feel healthy for many years, even without treatment. • ■ ART reduces the amount of virus in the body and allows the body to recover. • ■ Reducing viral load means longer life, better quality of life, and fewer symptoms. • ■ Treatment with ART is more effective when you start earlier. • ■ All people with HIV should start treatment as soon as possible. • ■ Effective treatment is available and free of cost in Indonesia.
3. Treatment as prevention	<ul style="list-style-type: none"> • ■ Taking ART as prescribed reduces the chance that you will pass HIV to your partner. • ■ You can prevent your partner from being infected or re-infected. • ■ To protect your partner when you start having sex again, make sure your virus is under control when you leave prison.
4. Starting HIV treatment	<ul style="list-style-type: none"> • ■ It's normal to have concerns when starting ART. For example: <ul style="list-style-type: none"> ○ Patients wonder if they can adjust to taking medicine every day ○ Patients may think that taking medicine means they are very sick or going to die ○ Patients wonder what their family members will think • ■ ART and methadone can be taken together. Your physician will adjust your methadone dose when you begin taking ART.
5. Advocating for treatment	<ul style="list-style-type: none"> • ■ If you are ready to start ART, it is important to tell your physician that you are ready. • ■ Your physician may ask how you plan to stick to the treatment. • ■ Be prepared to explain how you plan to stick to your treatment plan.
6. HIV status disclosure	<ul style="list-style-type: none"> • ■ It is important to talk to your partners about your HIV status so they can be tested. • ■ You never know how others will react to learning that you have HIV. • ■ Be patient. Don't expect people to understand your illness right away. Usually, people's perception of your illness will change with time. • ■ Use the support of your peers.

Note: ART = antiretroviral therapy; ATHENA = Adherence Through Home Education and Nursing Assessment.