Medication adherence decision-making among adolescents and young adults with cancer

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A B S T R A C T

Purpose: Nearly half of all adolescents and young adults (AYAs) with cancer struggle to adhere to oral chemotherapy or antibiotic prophylactic medication included in treatment protocols. The mechanisms that drive non-adherence remain unknown, leaving health care providers with few strategies to improve adherence among their patients. The purpose of this study was to use qualitative methods to investigate the mechanisms that drive the daily adherence decision-making process among AYAs with cancer.
Methods: Twelve AYAs (ages 15–31) with cancer who had a current medication regimen that included oral chemotherapy or antibiotic prophylactic medication participated in this study. Adolescents and young adults completed a semi-structured interview and a card sorting task to elucidate the themes that impact adherence decision-making. Interviews were transcribed verbatim and coded twice by two independent raters to identify key themes and develop an overarching theoretical framework.
Results: Adolescents and young adults with cancer described adherence decision-making as a complex, multi-dimensional process influenced by personal goals and values, knowledge, skills, and environmental and social factors. Themes were generally consistent across medication regimens but differed with age, with older AYAs discussing long-term impacts and receiving physical support from their caregivers more than younger AYAs.
Conclusions: The mechanisms that drive daily adherence decision-making among AYAs with cancer are consistent with those described in empirically-supported models of adherence among adults with other chronic medical conditions. These mechanisms offer several modifiable targets for health care providers striving to improve adherence among this vulnerable population.

1. Introduction

Cancer is the leading cause of disease-related death among adolescents and young adults (AYAs) ages 15–39 years (Centers for Disease Control and Prevention, 2010; National Cancer Institute, 2013). Advances in clinical care and treatment have substantially improved health outcomes for children and older adults with cancer (Adolescent and Young Adult Oncology Progress Review Group, 2006). In contrast, survival rates for 12 of the 20 most common AYA cancers have not improved since 1985 and are up to

33% lower than those in younger children (Bleyer, 2011; Bleyer, O'Leary, Barr and Ries, 2006; Khamly et al., 2009). Even when survival rates have improved (e.g., acute myeloid leukemia), AYAs demonstrate particularly poor outcomes, evidencing treatment-related mortality rates more than twice those of children under 15 years of age (25% versus 12%) (Canner et al., 2013).

Experts hypothesize that a primary cause of treatment failure and mortality among AYAs with cancer may be non-adherence to the oral chemotherapy and/or antibiotic prophylactic medication included in cancer treatment protocols (Adolescent and Young Adult Oncology Progress Review Group, 2006; Bleyer, 2002). Youth who are non-adherent to oral chemotherapy, or miss more than 5% of prescribed doses, are 2.5 times more likely to relapse than adherent youth (Bhatia et al., 2012). In addition, a study of 44 adolescents with cancer found that survival rates were lower among adolescents who were non-adherent to oral antibiotic

prophylactic medication than the survival rates among adolescents who were adherent (Kennard et al., 2004). As nearly half of all AYAs with cancer demonstrate non-adherence to oral chemotherapy (44%) or antibiotic prophylaxis (48%), more than 30,000 of the 69,000 AYAs diagnosed with cancer each year are likely at increased risk for devastating consequences (Bhatia et al., 2012; Festa et al., 1992; Kondryn et al., 2011; National Cancer Institute, 2013). Understanding and improving medication adherence may be one method of preventing relapse and reducing the survival deficit faced by AYAs with cancer (Bleyer et al., 2006).

The reasons why AYAs with cancer are non-adherent to potentially life-saving medications are not well understood (Butow et al., 2010; Kondryn et al., 2011). The few studies examining this question have identified broad constructs including deficits in information (i.e., lack of medication knowledge), limited family social support, and psychosocial difficulties (i.e., depressive symptoms) that predict non-adherence among AYAs with cancer (Hullmann et al., 2015; Kennard et al., 2004; Tebbi et al., 1986; Rohan et al., 2015). While these studies identify predictors of adherence behavior, the use of broad measures and single point assessments of adherence prevent conclusions as to the mechanisms that account for these relationships (Quittner et al., 2008). Specifically, the mechanisms that explain how or why factors like social support lead AYAs with cancer to be non-adherent remain unknown. This is problematic as mechanism identification is a necessary first step in evidence-based intervention development (Kok et al., 2004).

Identifying the mechanisms that result in non-adherence, thus, has the potential to inform clinical care and can be accomplished by conceptualizing the daily adherence decision as the result of a complex process in which AYAs consider multiple factors and make trade-offs among them (Wamboldt et al., 2011). Researchers have successfully used this approach to guide qualitative research that has elucidated how beliefs, feelings, and behaviors may lead to non-adherence among AYAs with asthma (Wamboldt et al., 2011). Extending this line of research to AYAs with cancer could clarify how medical teams can best help AYAs with cancer improve their adherence. Answering this question is critical as the only empirically-based adherence-promotion intervention for AYAs with cancer is a videogame that demonstrates limited effectiveness ($d = .05-.19$) (Kato et al., 2008). As a result, without novel efforts to understand the adherence decision-making process, medical teams will be left with few empirically-based strategies to improve adherence among their AYA patients.

The purpose of this study was to use a grounded theory approach to develop a novel theoretical model representing how various mechanisms (including those identified in previous research) impact adherence decision-making among AYAs with cancer. To achieve this aim, semi-structured interviews were used to explore the research question: "What are the mechanisms that drive the daily adherence decision-making process among AYAs with cancer?" In addition, AYAs were asked to complete a sorting task to provide additional information on the relative importance of each mechanism and further explore the question: "How do these mechanisms influence adherence decision-making?" Results were used to generate a novel model of adherence decision-making among AYAs with cancer. Implications for future research and efforts to enhance the effectiveness of adherence-promotion interventions for AYAs with cancer are also discussed.

2. Materials and methods

A grounded theory approach was used to develop a theoretical model of factors driving adherence decision-making among AYAs with cancer from the data (Holloway and Todres, 2003). Theory development began with a review of the existing literature. The literature review was conducted a priori to ensure that similar studies had not yet been conducted and identify gaps in the existing knowledge about the adherence decision-making process (Dunne, 2011). As detailed below, potential mechanisms identified from the previous literature were integrated into the semi-structured interview. Results of the interviews were then used to modify initial mechanisms and add new mechanisms as appropriate.

2.1. Participants

Participants for this study were recruited from an oncology clinic in a Midwestern Children's Hospital in the United States. Adolescents and young adults (ages 15–39 years) with a diagnosis of cancer and a prescription for oral antibiotic prophylaxis or chemotherapy were eligible to participate. Exclusion criteria included the presence of a significant cognitive deficit, a medical status that precluded study completion, or a lack of fluency in English. Purposive sampling was used to contact patients with a wide range of diagnoses and medical regimens (oral chemotherapy or oral antibiotic prophylaxis). Thirteen AYAs were approached during an outpatient oncology clinic visit. Twelve AYAs (92% recruitment rate) agreed to participate and completed a semi-structured qualitative interview, a demographic questionnaire, and a card sorting task directly following their clinic appointment. All procedures were approved by the Institutional Review Board and age-appropriate consent and assent (i.e., parental permission for AYAs < 18 years) were obtained.

2.2. Measures

2.2.1. Demographic and clinical information

Participants completed a demographic form including items assessing: patient age, gender, ethnicity, education, employment, and household composition. Cancer diagnosis, date of diagnosis, and current medical regimen were obtained via chart review. To ensure accuracy, data were entered independently by two individuals. Inconsistencies were resolved via consultation with the Principal Investigator (first author) and the medical record until 100% agreement was reached.

2.2.2. Qualitative interviews

One author conducted all interviews using a semi-structured guide to ensure that the same potential topics were covered for all AYAs while still allowing for the introduction of new relevant constructs. The semi-structured interview guide was developed based on previously published interview guides and expert consensus. Specifically, the authors obtained a copy of the semi-structured interview developed to identify themes influencing the decision to use infection prophylaxis among children with cancer and their caregivers and health care providers (Diorio et al., 2012). With permission, the semi-structured interview guide was modified by members of the authorship team who are experts in adherence and AYA oncology to include constructs relevant to the unique developmental period of adolescence and young adulthood (i.e., increased importance of peers, transition to independent living) that may impact adherence decision-making. An expert in decision-making serving as an outside consultant reviewed the revised interview guide and provided additional suggestions for modification.

The resulting semi-structured interview guide included questions related to: goals and priorities, patient preferences, and barriers and facilitators to adherence (e.g., "Tell me a little bit more about how you decide whether or not to take your medication each day," "What are the types of things that influence or impact how or when you take your medication?") and is available from the authors