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## Research brief

Pneumonia-related ideations, care-seeking, and treatment behaviors among children under 2 years with pneumonia symptoms in northwestern Nigeria

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Pneumonia remains the leading infectious cause of child mortality worldwide despite declines in pneumonia-related child mortality rates since 2000 globally<sup>1</sup>. In Nigeria, approximately 134 000 deaths among children under 5 years were due to pneumonia in 2017.<sup>2</sup> Prompt treatment of pediatric pneumonia symptoms is a cornerstone of child survival programs but remains a challenge in Nigeria. Psychosocial influences, or ideations, directly influence pathways to care but have not been previously measured or examined for pediatric pneumonia.

## Conceptual Framework

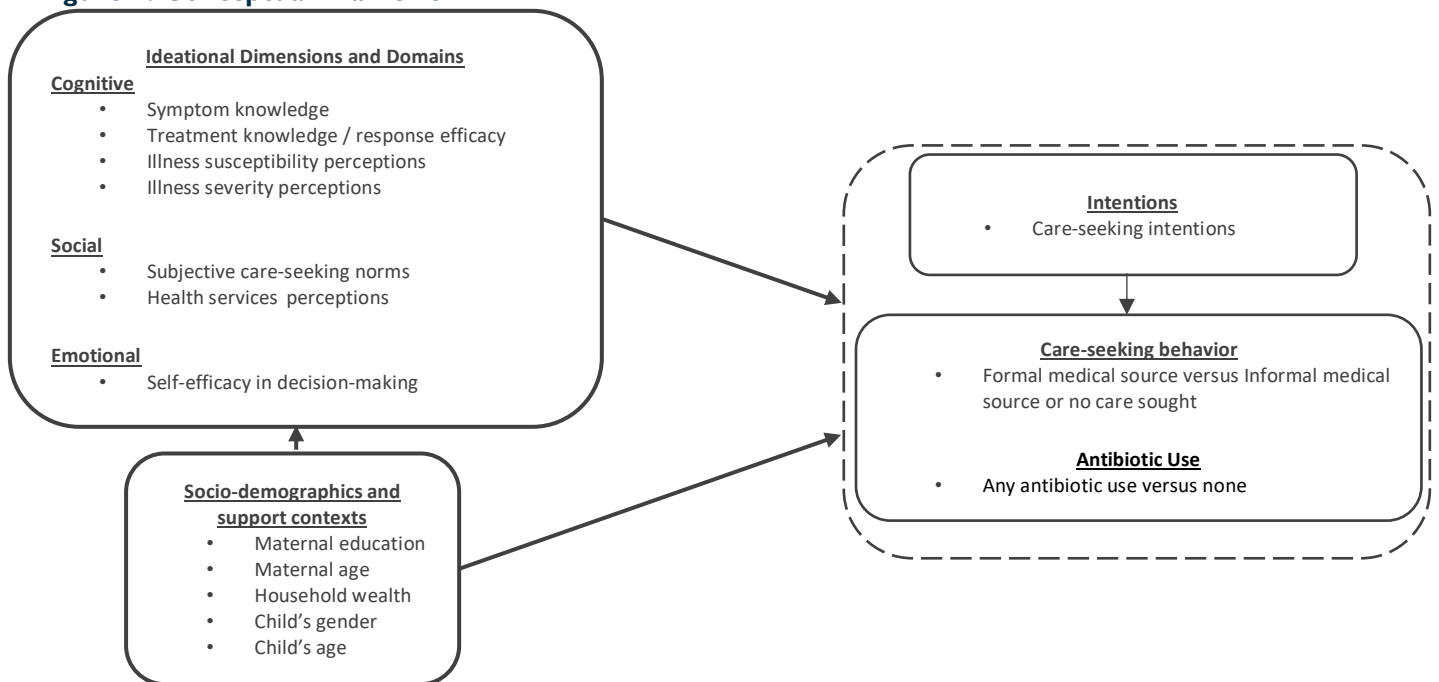
Kincaid’s Ideation Model of Strategic Communication and Behavior Change theorizes that psychosocial influences, or ideations, are intermediate determinants that help catalyze a person’s decision to engage in a specific action such as care-seeking or treatment for pneumonia symptoms.<sup>3</sup> In this model, ideations consist of three main domains—cognitive, emotional and social—and each contain specific psychosocial influences including knowledge, attitudes, beliefs, self-efficacy, perceived risk, subjective norms, and self-image (cognitive); emotional response, empathy, and self-efficacy (emotional); and social support, social

influence, interpersonal communication, and personal advocacy (social). We used this model to guide the development of ideational metrics for pediatric pneumonia care-seeking and treatment behaviors (**Figure 1**). In this analysis, we aimed to develop a set of pneumonia-related ideational factors and to examine the extent of their associations with care-seeking from formal medical sources and antibiotic use for children under 2 years with pneumonia symptoms in northwestern Nigeria.

## Methods

A two-stage cluster-sample cross-sectional population-based survey was conducted in Kebbi, Sokoto, and Zamfara States in September 2019. Across 108 enumeration areas, all households were enumerated to census pregnant women and randomly sample women with children under 2 years (“under-twos”) for inclusion. Respondents were asked about pediatric pneumonia and other health-related behaviors and ideations developed using the Ideation Model of Strategic Communication and Behavior Change. Prevalence ratios for predictors of care-seeking from formal medical sources and antibiotic treatment for pneumonia symptoms among under-twos were calculated using mixed-effects Poisson regression models with robust error variance.

**Figure 1: Conceptual Framework**



## Results

Among 350 under-twos with pneumonia symptoms, 33.8% were taken to formal medical care and 38.0% used antibiotics. Women who positively viewed treatment efficacy and those who positively viewed health services quality had 1.35 (95% CI: 1.00-1.82; P=0.050) and 2.13 (95% CI: 1.35-3.35; P=0.001) times higher likelihood of attending formal medical sources, while women viewing peers as mostly attending drug shops had 29% lower likelihood (Table 1). Caregivers were also significantly less likely to seek formal medical care for infants 0 to 5 months with pneumonia symptoms than for older children aged 12 to 23 months (0.66, 95% CI: 0.44–0.99, P=0.040). For antibiotic use, perceived treatment efficacy and illness susceptibility were significant predictors (Table 2). Lastly, children living in the richest households were 45% more likely to receive antibiotics for pneumonia symptoms than those living in the poorest households (1.45, 95% CI: 1.08–1.94; P = .010).

## Program implications

We found low levels of care-seeking from formal medical sources (33.8%) and antibiotic use (38.0%) among children under 2 years with pneumonia symptoms in study areas. Behavioral outcomes were significantly associated with psychosocial influences, or ideations, related to maternal beliefs about treatment efficacy, health services quality, social norms, and perceived illness severity and susceptibility after adjustment for sociodemographics. Findings suggest that programs focusing on increasing pneumonia knowledge alone may not be sufficient to improve care-seeking and treatment rates, and should expand to address perceived and actual poor-quality health services and maternal beliefs about treatment efficacy, social norms, illness severity and susceptibility. Ideational metrics provide program-relevant insights about beliefs or perceptions that may impede behavioral change needed to reduce deaths from this leading cause of child mortality.

**Table 1: Ideational predictors of formal care-seeking for pediatric pneumonia symptoms among under-twos**

Domain	Likert-scale question	Response	Prevalence ratio	95% CI	pvalue
Health services perception	Health facilities in my community frequently have treatments needed for sick children	Agree	2.13	1.35-3.35	0.001
		Disagree	1.00 (Reference)		
Treatment knowledge / response efficacy	Spontaneously reported that antibiotics are effective in treating pediatric pneumonia	Yes	1.35	1.00-1.82	0.050
		No	1.00 (Reference)		
Subjective care-seeking norms	Most women in this community would go to a drug shop or traditional provider for pediatric pneumonia symptoms before visiting a facility	Agree	0.71	0.52-0.97	0.030
		Disagree	1.00 (Reference)		

\*Likert scale are defined as agree (strongly or somewhat) and disagree (strongly or somewhat)

**Table 2: Ideational predictors of antibiotic use for pediatric pneumonia symptoms among under-twos**

Domain	Likert-scale question	Response	Prevalence ratio	95% CI	pvalue
Treatment knowledge / response efficacy	Spontaneously reported that antibiotics are effective in treating pediatric pneumonia	Yes	1.86	1.26-2.74	0.002
		No	1.00 (Reference)		
Illness susceptibility	Only weak children die from pneumonia	Agree	0.71	0.52-0.98	0.040
		Disagree	1.00 (Reference)		

\*Likert scale are defined as agree (strongly or somewhat) and disagree (strongly or somewhat)

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