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INDIVIDUALS' INFANT VACCINATION DECISIONS: THE ASSOCIATION WITH OBJECTIVE AND SUBJECTIVE KNOWLEDGE

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Abstract

Despite the successful role of vaccination in health promotion, vaccine hesitancy remains a growing concern. Information technology and social media fuel vaccine hesitancy, spreading dis- and misinformation about vaccination, affecting caregivers' ability to make informed decisions on whether to vaccinate their infants. This South African study investigated the association of vaccination decisions with objective and subjective knowledge. Objective knowledge was measured using a standardised scale on general vaccine-related proven facts, while the 5-point Likert scale on subjective knowledge was developed from similar studies and vaccine-related literature. The online survey used convenience and purposive sampling (N = 415). Only 73.6% of respondents had made a positive decision to vaccinate their infants. Respondents scored under average (45.7%) on the objective knowledge test, while the mean score (3.61 ± 0.68) for subjective knowledge indicated a knowledge self-rating higher than other people. A positive vaccination decision correlated positively with objective knowledge and negatively with subjective knowledge. There was also a difference in subjective knowledge, with respondents with a negative decision rating their subjective knowledge higher than those with a positive decision. Our results indicate that objective knowledge about infant vaccinations remains low, although individuals perceive their knowledge to be more than others, suggesting that they are unaware of their knowledge limitations. Since both objective and subjective knowledge showed correlations with vaccination decisions, both these types of knowledge should be considered in the planning of health promotion attempts to improve vaccination uptake.

Keywords: *Health promotion, objective knowledge, subjective knowledge, infant vaccinations, vaccination decisions.*

1. Introduction

The coronavirus disease 2019 (COVID-19) pandemic emphasised the critical role of vaccines in health promotion, while vaccine hesitancy thwarted efforts to halt the pandemic in various settings. Social media vastly contributes to the spread of information, misinformation and disinformation (Lee et al., 2023), leaving people with an information overload that can make it difficult to distinguish between scientifically proven facts, pseudoscience and conspiracy theories (Daubs, 2024). When primary caregivers of infants have to decide whether or not to vaccinate their infants, they are bombarded with all this available information, without always being able to judge the integrity of the information. Mis- and disinformation are often spread using techniques to grab the attention and be more memorable, such as inciting fear and uncertainty, which complicate the filtering of information (Daubs, 2024). In contrast, scientific facts are usually stated as 'matter of fact' and without emotion, and consequently, are less memorable. As a result, misunderstandings regarding, for example, the safety and effectiveness of vaccines fuel vaccine hesitancy (Joslyn et al., 2023).

Accurate health information is essential for positive health behaviours (Canady & Larzo, 2022) such as vaccination uptake. While providing health explanations in everyday language proved to reduce vaccine hesitancy (Joslyn et al., 2023), the mere provision of explanations might not be sufficient to increase a willingness to vaccinate as people tend to only focus on elements of an explanation that support their current view (Joslyn et al., 2023). Also, cognitive biases such as The Dunning-Kruger Effect (DKE) (the inability to recognise a lack of ability or knowledge) prevent people from acquiring accurate information (Canady & Larzo, 2022). Individuals' self-assessed knowledge or their perception of how much they know about a specific topic is termed subjective knowledge (Park et al., 1994). In the present study, we

investigated the association between caregivers' infant vaccination decisions and how much they know (objective knowledge) about vaccination, and how much they think they know (subjective knowledge) about vaccination.

2. Methods

This quantitative cross-sectional study used convenience and purposive sampling, and was advertised on Facebook, targeting South African adults caring for children aged 12 to 23 months old. The advertisement led to the electronic questionnaire on SurveyMonkey. A total of 415 questionnaires were sufficiently completed for meaningful analysis and included 303 fully completed questionnaires.

Respondents' vaccination decisions were determined by the vaccination status of their youngest child or their intention to vaccinate their youngest child. A positive decision was established when their infant's vaccination status was up to date and on schedule, or when they indicated their intention to catch up on delayed or missed vaccinations. A negative decision was indicated by respondents stating that a deliberate decision was taken to delay the vaccination or to not vaccinate.

The section on objective knowledge of general vaccine-related scientifically proven facts was measured using the scale of Zingg and Siegrist (2012). It consisted of eleven statements where respondents indicated the statement as correct, incorrect or "I don't know". Subjective knowledge was measured with a 5-point Likert scale (1 = Do not know more than others; 5 = Know a lot more than others), developed using questions from similar studies (Donoghue et al., 2016; Pieniak et al., 2010; House et al., 2004) and vaccine-related literature.

Exploratory factor analysis (EFA) was conducted on the objective and subjective knowledge items, and Kaiser-Meyer-Olkin measures of sampling adequacy (KMO) were used to determine suitability for EFA. Reliability was measured using Cronbach α (for Likert scale data) and Kuder-Richardson 20 reliability coefficient (KR-20) (for dichotomous data). Spearman's rank-order correlations were determined between the vaccination decision with objective knowledge and subjective knowledge, respectively.

The study was approved by the North-West University Health Research Ethics Committee (approval number NWU-00104-17-A1).

3. Results

Respondents were 91.6% female (380/415), 85.5% (355/415) employed, well-educated with 65.1% (270/415) holding a degree and 96.4% (400/415) completed at least secondary school. Most (81% [336/415]) respondents earned a monthly income of more than R10 000 (> ± 536 Euro). Of respondents answering the question on vaccination status of their youngest infant, 73.6% (304/413) had made positive vaccination decisions, while 72.2% (298/413) reported their infants being fully vaccinated.

Objective knowledge items loaded onto one factor during EFA, with KMO = 0.91 and KR-20 = 0.89, indicating good internal reliability. Respondents scored 45.7% (SD = 34%) correct answers on the objective knowledge test. Subjective knowledge loaded into one factor, with KMO = 0.91 and Cronbach alpha = 0.92, indicating good internal reliability. Respondents' mean subjective knowledge score was 3.61 (SD = 0.68).

Objective knowledge correlated positively with a positive vaccination decision ($r = 0.33$, $p \leq 0.01$); subjective knowledge correlated negatively with a positive vaccination decision ($r = -0.30$; $p \leq 0.01$). Respondents with a negative decision knew (mean = 27% correct, SD = 21%) practically significantly less (Cohen's $d = 0.72$) about infant vaccination than those with a positive decision (mean = 53% correct, SD = 36%). Also, respondents with a negative decision tended to differ (Cohen's $d = 0.62$) from those with a positive decision in terms of subjective knowledge. Respondents with a negative decision rated their subjective knowledge higher (mean = 3.94, SD = 0.72) than those with a positive decision (mean = 3.49; SD = 0.63).

4. Discussion

Our results indicate that objective knowledge regarding infant vaccination was low, with respondents who decided against vaccinating their infants having lower knowledge than those who made positive vaccination decisions, as illustrated by the direction of our correlation results. At the same time, those with a negative decision perceived their own knowledge to be higher than those with a positive decision. Our results align with the DKE, where people with a lack of knowledge do not recognise their information deficit, which may prevent them from acquiring more accurate information (Canady & Larzo, 2022).

In order to make well-informed vaccination decisions, people need more accurate knowledge (Canady & Larzo, 2022). The mere presentation of scientific facts proved to be ineffective in increasing objective knowledge; therefore, training and applying specific communication strategies is suggested to improve factual knowledge and ultimately reduce vaccine hesitancy (Gagneur et al., 2024; Joslyn et al., 2024) – especially when high subjective knowledge is prevalent.

We acknowledge that vaccine hesitancy is a complex phenomenon, with various influencing factors (Nuzhath et al., 2024; Wiysonge et al., 2022; Yalçin et al., 2020) which can be context-specific and change over time. However, in light of the recent pandemic and 'infodemic" (Lee et al., 2023), this study offers insights into the critical role of different types of knowledge in vaccination decisions, and emphasises effective communication of factual information as an essential aspect to consider in health promotion efforts to increase vaccine uptake.

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