VOLUME 18 • SEP/OCT 2025

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KANSAS JOURNAL of MEDICINE

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KANSAS JOURNAL of MEDICINE

Original Research

Association of Maternal Language Spoken at Home with Prenatal Care and Delivery Outcomes among Asian and Pacific Islander Populations in Kansas

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Received Apr. 27, 2025; Accepted for publication Aug. 28, 2025; Published online Oct. 15, 2025
Kans J Med 2025 Sep-Oct; 18:99-103. https://doi.org/10.17161/kjm.vol18.23910

ABSTRACT

Introduction. In the United States, limited English proficiency (LEP) and provider-patient language discordance are associated with poorer medical outcomes compared with English-proficient, language-concordant patients. Asian American and Pacific Islander (AAPI) populations have higher-than-average rates of LEP and may be more vulnerable to adverse outcomes. The authors of this study examined differences in risk factors, medical care, and delivery outcomes between AAPI individuals who gave birth and spoke English at home versus those who spoke an AAPI language at home.

Methods. De-identified birth and death certificate data from January 1, 2005, to December 31, 2018, were obtained from the Kansas Department of Health and Environment (N = 17,067). Risk factors, medical care, and delivery outcomes were compared between AAPI language speakers and English speakers using likelihood chi-square and Fisher exact tests.

Results. Non-English speakers initiated prenatal care later ($p < 0.0001$) and received less adequate prenatal care ($p < 0.0001$). They also had higher rates of forceps- and vacuum-assisted deliveries ($p < 0.0001$), and third- or fourth-degree perineal lacerations ($p < 0.0001$) compared with English speakers. Neonatal outcomes largely were similar between groups.

Conclusions. Within the AAPI community in Kansas, speakers of AAPI languages experienced poorer maternal delivery outcomes, specifically higher rates of assisted deliveries and severe perineal lacerations, compared with English speakers. These disparities may reflect patient-provider language discordance, which can limit patient autonomy and influence decision-making in urgent or emergent situations, as well as broader structural determinants of health.

INTRODUCTION

In 2019, 8% of Americans aged five years or older reported speaking English less than "very well," and 22% reported speaking a language other than English at home.[1] Although many American physicians speak non-English languages, significant mismatches exist between physician language skills and the languages spoken by non-English-speaking populations.[2] This patient-provider language discordance has been associated with lower patient satisfaction, reduced access to preventive care, and fewer interventions in emergency departments compared with English-proficient (EP) patients.[3-7] Children of parents with limited English proficiency (LEP) also experience poorer health status and quality of life than those with EP parents.[8-10]

Many Asian and Pacific Islander (AAPI) languages, such as Polynesian, Burmese, Southeast Asian languages, Filipino, Korean, Indonesian, Vietnamese, Thai, and Japanese, are among the least spoken by United States physicians.[2] Consequently, speakers of these languages face greater communication barriers, further compounded by the fact that the AAPI population has a much higher LEP rate than the national average.[1]

While the use of qualified interpreters can help mitigate adverse effects of LEP, Section 1557 of the Patient Protection and Affordable Care Act (ACA) and Title VI require facilities receiving federal funds to provide meaningful access for LEP individuals.[11-13] Despite these requirements, compliance remains low, and many patients do not receive care in their preferred language, often due to time constraints, interpreter shortages, or limited accessibility.[14-18]

The authors of this study examined associations between language spoken at home and risk factors, medical care, and delivery outcomes among English speakers and AAPI language speakers within the AAPI population of Kansas.

METHODS

Data. De-identified data were obtained from Kansas birth certificates for all births between January 1, 2005, and December 31, 2018, and death certificates for infants born during that period.

Instrument. The Kansas Department of Health and Environment (KDHE) provided a de-identified dataset from the Vital Statistics Linked Birth/Death database. Demographic variables included maternal race, age, rural/urban delivery location, and payment method. Outcome variables included: month prenatal care began, adequacy of prenatal care (Kotelchuck Index), route of delivery, third- or fourth-degree perineal lacerations, significant birth injury, birth weight, and gestational age. The Kotelchuck Index categorizes care as *adequate plus*, *adequate*, *intermediate*, or *inadequate*. Significant birth injury was determined by a clinician using physical exam and delivery history.[19]

Because English proficiency was not recorded, language spoken at home was used as the primary independent variable and served as a proxy for potential English proficiency (further discussed in the limitations). "Non-English" languages included Assamese, Bahasa, Bengali, Bisayan, Burmese, Cantonese, Carolinian, Cebuano, Chin (various dialects), Chuukese, Dengka, Fijian, Filipino, Gujarati, Hakha Chin, Hindi, Hmong, Hokkien, Indonesian, Japanese, Jingpho, Kamar, Kannada, Karen, Kashmiri, Kodava, Konkani, Korean, Kosraean, Kutchi, Lao, Lautu/Lutuv Chin, Maithili, Malay, Malayalam, Mandarin, Marathi, Marshallese, Marwari, Meitei, Mongolian, Nepali, Odia, Palauan, Pohnpeian, Punjabi, Rohingya, Saurashtra, Sindhi, Sinhala, Tamil, Telugu, Thai, Tlapanec, Trukese, Urdu, Uyghur, Vietnamese, Zomi, and Zotung.

Procedures. This project was approved by The University of Kansas Medical Center Institutional Review Board (IRB). To reduce potential confounding, we included data from the vital statistics dataset on

singleton births to mothers who reported Asian or Native Hawaiian/Pacific Islander descent and spoke either English at home (hereafter referred to as "English-speakers") or one of the listed non-English languages at home (hereafter referred to as "non-English-speakers").

Statistical Analysis. Analyses were conducted using SAS Version 9.4 (SAS Institute, Cary, NC). Categorical variables were compared using Likelihood Chi-square and Fisher's exact test; continuous variables were compared using Student's t-test and ANOVA. Significance was set at $p \leq 0.05$.

RESULTS

Sample Characteristics. Demographic information is presented in Table 1. Of 536,446 singleton births, 17,067 met inclusion criteria. Most mothers were English-speaking (76.9%), aged 18-34 (79.2%), delivered in urban counties (76.0%), and had private/employer insurance (69.3%). Prenatal care typically began in the first (41.8%) or second trimester (54.6%), with most receiving adequate (51.9%) or adequate plus (29.2%) care. Spontaneous vaginal deliveries were most common (64.6%); forceps (1.9%) and vacuum-assisted (3.7%) deliveries were least common. Most had no third- or fourth-degree lacerations (98.0%). Neonatal outcomes were favorable, with 87.4% normal birth weight, 91.6% full-term, and >99.9% without significant birth injury.

Sociodemographic Differences. Compared to English-speakers, non-English-speakers were (Table 2):

- Less likely to have advanced maternal age (18.2% vs. 20.2%, p = 0.0016)
- More likely to deliver in rural counties (31.2% vs. 20.5%, p <0.0001)
- More likely to self-pay (10.1% vs. 5.5%, p <0.0001)
- Less likely to have TRICARE/Civil Health and Medical Program of the Uniformed Services (CHAMPUS; 0.7% vs. 7.2%, p <0.0001).

Prenatal Care. Non-English-speakers were less likely to initiate care in the first trimester (38.2% vs. 43.3%, p <0.0001) and more likely to receive inadequate care (16.1% vs. 11.6%, p <0.0001; Table 3).

Maternal Delivery Outcomes. Spontaneous vaginal deliveries were common in both groups, but non-English-speakers had higher rates of (Table 4):

- Forceps-assisted delivery (2.4% vs. 1.7%, p <0.0001)
- Vacuum-assisted delivery (5.5% vs. 3.2%, p <0.0001)
- Third-/fourth-degree perineal lacerations (3.2% vs. 1.6%, p <0.0001)

Neonatal Delivery Outcomes. Non-English-speakers had slightly higher rates of low birth weight (8.7% vs. 8.1%) and lower rates of macrosomia (3.5% vs. 4.7%, p = 0.0057). No significant differences were found for gestational age or significant birth injury (Table 5).

Table 1. Characteristics of people of Asian and Pacific Islander descent with singleton births in Kansas (2005-2018).

Language Spoken at Home	n (%)
Non-English	3,701 (23.1%)
English	12,334 (76.9%)
Maternal Age at Time of Birth	
10-17 years	152 (0.9%)
18-34 years	13,521 (79.2%)
35 years or more	3,390 (19.9%)
Urban vs. Rural	
Rural	4,096 (24.0%)
Urban	12,971 (76.0%)
Payment Method	
Medicaid	2,561 (15.2%)
Private/Employer	11,635 (69.3%)
Self-pay	1,224 (7.3%)
Indian Health Services	3 (<0.1%)
Civil Health and Medical Program of the Uniformed Services (CHAMPUS)/TRICARE	911 (5.4%)
Other Government	253 (1.5%)
Other	214 (1.3%)
Month Prenatal Care Began	
0-2.9 months	6,943 (41.8%)
3-6.9 months	9,077 (54.6%)
7-11.9 months	604 (3.6%)
Calculated Adequacy of Prenatal Care	
Adequate plus	4,819 (29.2%)
Adequate	8,579 (51.9%)
Intermediate	956 (5.8%)
Inadequate	2,178 (13.2%)
Delivery Method	
Spontaneous Vaginal Delivery	10,996 (64.6%)
Forceps-Assisted Vaginal Delivery	317 (1.9%)
Vacuum-Assisted Vaginal Delivery	630 (3.7%)
Cesarean Section	5,091 (29.9%)
3rd or 4th Degree Laceration	
Yes	341 (2.0%)
No	16,725 (98.0%)
Gestational Age at Delivery	
Preterm	1,433 (8.4%)
Full-term	15,589 (91.6%)
Birthweight	
Low	1,409 (8.3%)
Normal	14,909 (87.4%)
Macrosomia	749 (4.4%)
Significant Birth Injury to Neonate	
Yes	9 (0.1%)
No	17,057 (>99.9%)

Table 2. Comparison of sociodemographic risk factors of people of Asian and Pacific Islander descent with singleton births in Kansas (2005-2018): English vs. Asian and Pacific Islander (non-English) languages spoken at home.

Sociodemographic Results	Non-English-speaking	English-speaking	
	n (%)	n (%)	p-Value
Maternal Age at Time of Birth			
10-17 years	22 (0.6%)	121 (1.0%)	
18-34 years	3,005 (81.2%)	9,718 (78.8%)	0.0016
35 years or more	673 (18.2%)	2,495 (20.2%)	
Urban vs. Rural			
Rural	1,153 (31.2%)	2,533 (20.5%)	<0.0001
Urban	2,548 (68.9%)	9,801 (79.5%)	
Payment Method			
Medicaid	573 (15.6%)	1,877 (15.3%)	
Private/Employer	2,584 (70.4%)	8,525 (69.4%)	
Self-pay	370 (10.1%)	674 (5.5%)	
Indian Health Services	0 (0.0%)	3 (<0.1%)	
Civil Health and Medical Program of the Uniformed Services (CHAMPUS)/ TRICARE	24 (0.7%)	7,887 (7.2%)	<0.0001
Other Government	75 (2.0%)	164 (1.3%)	
Other	44 (1.2%)	149 (1.2%)	

Table 3. Comparison of prenatal care risk factors of people of Asian and Pacific Islander descent with singleton births in Kansas (2005-2018): English vs. Asian and Pacific Islander (non-English) languages spoken at home.

Prenatal Care Results	Non-English-speaking	English-speaking	
	n (%)	n (%)	p-Value
Month Prenatal Care Began			
0-2.9 months	1,389 (38.2%)	5,258 (43.3%)	
3-6.9 months	2,097 (57.7%)	6,509 (53.6%)	<0.0001
7-11.9 months	150 (4.1%)	379 (3.1%)	
Calculated Adequacy of Prenatal Care			
Adequate plus	1,008 (28.0%)	3,580 (29.6%)	
Adequate	1,806 (50.1%)	6,432 (53.2%)	
Intermediate	209 (5.8%)	689 (5.7%)	<0.0001
Inadequate	579 (16.1%)	1,398 (11.6%)	

Table 4. Comparison of maternal delivery outcomes of people of Asian and Pacific Islander descent with singleton births in Kansas (2005-2018): English vs. Asian and Pacific Islander (non-English) languages spoken at home.

Maternal Delivery Outcomes	Non-English-speaking	English-speaking	
	n (%)	n (%)	p-Value
Delivery Method			
Spontaneous Vaginal Delivery	2,278 (61.6%)	8,066 (65.4%)	
Forceps-Assisted Vaginal Delivery	89 (2.4%)	210 (1.7%)	
Vacuum-Assisted Vaginal Delivery	204 (5.5%)	3,394 (3.2%)	<0.0001
Cesarean Section	1,130 (30.5%)	3,664 (29.7%)	
3rd or 4th Degree Laceration			
Yes	120 (3.2%)	195 (1.6%)	<0.0001
No	3,581 (96.8%)	12,139 (98.4%)	

Table 5. Comparison of neonatal delivery outcomes of neonates born to people of Asian and Pacific Islander descent in singleton births in Kansas (2005-2018): English vs. Asian and Pacific Islander (non-English) languages spoken at home.

Neonatal Delivery Outcomes	Non-English-speaking	English-speaking	
	n (%)	n (%)	p-Value
Gestational Age at Time of Delivery			
Preterm	305 (8.3%)	1,028 (8.4%)	0.8652
Full-term	3,385 (91.7%)	11,278 (91.7%)	
Birthweight			
Low	320 (8.7%)	999 (8.1%)	
Normal	3,253 (87.9%)	10,762 (87.3%)	0.0057
Macrosomia	128 (3.5%)	573 (4.7%)	
Significant Birth Injury			
Yes	2 (0.1%)	6 (0.1%)	0.8975
No	3,699 (>99.9%)	12,328 (>99.9%)	

DISCUSSION

Sociodemographic Risk Drivers. Demographic factors strongly influence pregnancy outcomes. Extremes of maternal age, rural delivery, and self-pay or Medicaid coverage are linked to poorer prenatal care and outcomes.[20-24] These effects may stem from direct biological factors, such as oxidative stress from pollution, and indirect social or psychosocial factors, such as reduced access to amenities, increased stress, or limited healthcare access.[25]

In this study, non-English-speakers were less likely to have extremes of maternal age (a protective factor) but more likely to self-pay and deliver in rural areas, both of which increase risks of inadequate prenatal care, morbidity, and mortality.[22,24] Overall, sociodemographic risks for non-English-speakers were mixed.

Prenatal Risk Drivers. Adequate prenatal care reduces risks of premature birth, stillbirth, and infant mortality.[26] Late or infrequent visits are associated with poorer outcomes, while starting care within the first 6-10 weeks helps prevent complications.[27,28] Barriers include lack of information about services, low income, unemployment, and lack of insurance.[29-35]

Non-English-speakers in this study were less likely to begin prenatal care in the first trimester and more likely to receive inadequate care, likely influenced by higher rates of self-pay and rural deliveries.[36] Language barriers may further contribute by complicating health care

interactions, prompting discrimination, or signaling other co-occurring risks.[37]

Maternal Delivery Outcomes. Delivery carries substantial risks, with complications in ~30% of cases.[38] Vaginal delivery is generally safest,[39-45] while forceps- and vacuum-assisted deliveries, often indicated for fetal distress or prolonged labor, carry maternal and neonatal risks.[39-43] Cesarean sections can be lifesaving but are associated with higher costs, increased maternal rehospitalization, and poorer neonatal outcomes.[46-50]

Non-English-speakers had higher rates of forceps- and vacuum-assisted deliveries, possibly due to difficulties following instructions through interpreters, interpreter delays, or provider uncertainty during emergencies. Significant differences also were observed in third- and fourth-degree perineal lacerations (4-11% of deliveries),[51-55] which were more common among non-English-speakers despite their neonates' slightly lower birth weights. The higher operative delivery rate likely contributed to this finding.[55,56]

Neonatal Delivery Outcomes. Apart from minor differences in birth weight, neonatal outcomes, gestational age and birth injury rates, did not differ significantly between groups. This aligns with prior studies showing language-linked disparities in maternal outcomes but not in neonatal results.[57]

Implications. Risks linked to speaking a non-English language at home can be mitigated. Strategies include early identification of patients needing interpreters, provider training in interpreter use, and communication methods like "Teach-back." Preparing patients during prenatal visits for potential operative deliveries also could improve outcomes. Preventive measures, such as perineal massage and warm compresses, may help reduce severe lacerations.[58,59]

Limitations. Language spoken at home was used as a proxy for LEP due to dataset constraints, though prior studies suggest substantial overlap.[57,60] Race classification may have been imperfect, and hospitals' interpreter capabilities likely vary by language. Through this study, authors identified associations but not causation; future work should focus on specific languages and mechanisms behind disparities.

We acknowledge that the data predate the COVID-19 pandemic, limiting our ability to assess its specific impact. Pre- and postnatal care, interpreter access, and overall medical care may have changed since then. However, the study's focus on potentially persistent systemic barriers, its extensive 13-year dataset, and the lack of published data on this population support its continued relevance. These findings provide important insights into pre-pandemic clinical realities and establish a baseline for assessing post-pandemic health care changes in Kansas.

CONCLUSIONS

Among Asian and Pacific Islander patients, non-English-speakers were more likely to receive inadequate prenatal care and experience higher rates of operative deliveries and severe perineal lacerations. Neonatal outcomes were largely unaffected. These disparities may reflect communication barriers and structural challenges in access to care, underscoring the need for targeted interventions and further research.

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Keywords: Asian American Native Hawaiian and Pacific Islander; English Proficiency, Limited; Pregnancy Outcome; Prenatal care; Health inequities

Funding: This study was funded in part by a generous donation by The Wichita Open.
Presentation: Information has been previously presented at The University of Kansas School of Medicine-Wichita Research Forum on April 16, 2024, Wichita, Kansas.
Conflicts: None reported.
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KANSAS JOURNAL of MEDICINE

Original Research

Public Awareness of Risks Associated with Alcohol Drinking in the US: A Population-Based Cross-Sectional Survey Study

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Received Aug. 2, 2025; Accepted for publication Aug. 29, 2025; Published online Oct. 15, 2025
Kans J Med 2025 Sep-Oct; 18:104-110. https://doi.org/10.17161/kjm.vol18.24277

ABSTRACT

Introduction. Alcohol consumption is a leading preventable cause of morbidity and mortality in the United States, contributing to over 178,000 deaths annually. Despite known links to liver disease and cancer, few adults report receiving counseling on alcohol-related risks from health care professionals. Authors of this cross-sectional, population-based study assessed the prevalence of alcohol-related counseling among United States adults and identified sociodemographic and behavioral factors associated with receiving such advice.

Methods. Data were drawn from the 2022 Health Information National Trends Survey, a nationally representative sample of United States adults. The primary outcome was whether respondents reported receiving information from a health care professional about the negative health risks of alcohol use, including specific negative health consequences. Survey-weighted univariate, bivariate, and multivariable logistic regression analyses were used to identify predictors of receiving counseling.

Results. Only 26.1% of respondents reported receiving alcohol-related counseling, and just 10.9% specifically were informed about liver disease. Multivariable analysis showed higher odds of counseling among adults aged 18-34 (OR = 2.43; 95% CI, 1.84-3.21), non-Hispanic Black respondents (OR = 1.45; 95% CI, 1.20-1.75), those with income under $20,000 (OR = 1.27; 95% CI, 1.02-1.59), and individuals consuming more than one alcoholic drink per week (OR = 1.40; 95% CI, 1.22-1.61). Lower odds were found among women (OR = 0.67; 95% CI, 0.59-0.77), and those worried about cancer (OR = 0.81; 95% CI, 0.67-0.96).

Conclusions. Findings highlight important gaps and disparities in alcohol-related counseling. Standardized interventions and improved outreach are needed to align prevention efforts with patient risk.

INTRODUCTION

Alcohol consumption is a leading preventable cause of morbidity and mortality in the United States, contributing to more than 178,000 deaths annually.[1] In 2010, alcohol consumption also cost the nation an estimated $249 billion in economic losses.[2] Despite these substantial public health burdens, many patients report not receiving information about alcohol-related health risks from their health care professionals.[3]

Emerging evidence underscores the role of alcohol as a carcinogen. Both the Centers for Disease Control and Prevention (CDC) and the World Health Organization (WHO) recognize alcohol use as a risk factor for at least seven types of cancer, including breast, liver, and colorectal cancers.[4-6] While awareness of these associations is important, relying solely on cancer incidence as an indicator of alcohol-related harm has its challenges as cancer often develops over time. In contrast, clinical markers such as liver function often reveal more immediate signs of alcohol-related damage and can prompt earlier interventions.[7] Hence the need to educate the public on all the harmful links associated with alcohol use.

Brief interventions by health care professionals, such as counseling patients about the risks of alcohol use, effectively can reduce consumption, especially when delivered consistently and empathetically.[8,9] Yet national surveys have indicated that fewer than one in three adults report having such conversations with their health care professional, even among those who engage in risky drinking behaviors.[9,10]

Notably, disparities exist in who receives this counseling. Older, White, and male patients are more likely to be advised about alcohol-related risks, while younger adults, women, and racial or ethnic minorities are less likely to receive evidence-based guidance.[9,11,12] Understanding current patterns of alcohol risk communication and identifying underserved populations are needed to inform public health efforts and improve clinical practice.

The objective of this study was to assess the prevalence of adults in the United States receiving alcohol-related health counseling from health care professionals and to identify sociodemographic and behavioral factors associated with these discussions. By examining who receives such guidance, and who does not, findings from this study will help inform strategies that promote more equitable, effective communication about alcohol-related health risks in clinical settings.

METHODS

Sample Design and Target Population. Data for the 2022 Health Information National Trends Survey 6 (HINTS 6) were collected through a self-administered mail and web survey conducted between March 7 and November 8, 2022, from civilian, non-institutionalized adults aged 18 years and older in the United States. The survey used a two-stage, stratified design. First, a stratified sample of residential addresses was selected; second, one adult was chosen from each sampled household.[13] The HINTS 6 design expanded the previous two strata (high-minority and low-minority) into four strata by further dividing them into rural and urban areas. The survey represented an estimated weighted population of 258,418,467 adults, with an unweighted total of 6,252 respondents and a response rate of 28.1%.[13] No observations were deleted. Unweighted sample sizes for all weighted estimates are reported in Table 1.

Data Source and Study Population. This cross-sectional study used data from HINTS 6, a nationally representative survey of United States adults.[14] We included respondents aged 18 years and older who answered the question on whether they had heard about the negative

health consequences of drinking alcohol from a doctor or other health professional in the past 12 months. The study followed the STROBE (Strengthening the Reporting of Observational Studies in Epidemiology)[15] and PRICSSA (Preferred Reporting Items for Complex Sample Survey Analysis)[16] guidelines. Because the data were publicly available and de-identified, institutional review board (IRB) oversight was not required. HINTS 6 received a "Not Human Subjects Research" determination from the National Institutes of Health Office of IRB Operations on August 16, 2021 (iRIS reference number: 562715).[17]

Outcome Variables. The primary outcome was whether participants had heard about the negative health consequences of drinking alcohol, measured by the question: *"In the past 12 months, have you heard about the negative health consequences of drinking alcohol from doctors or other health care professionals?"* Response options were: *"Yes," "No,"* or *"I have not had any medical appointments in the past 12 months."*

The secondary outcome assessed the type of negative health consequences discussed, based on the question: *"Which of the following health consequences of alcohol did the doctor or other health care professional discuss...?"* Possible responses included: *"Alcoholism," "Cancer," "Diabetes," "Heart Disease,"* and *"Liver Disease."*

Predictors. Selected behavioral variables and cancer-related beliefs to describe the study population were based on whether respondents reported receiving counseling about the health risks associated with drinking alcohol. These clinically relevant predictors were selected using a pre-specified full model, an approach used in multivariable prediction modeling in which predictors are selected and included in the model *a priori*, based on clinical knowledge or existing evidence, rather than post hoc statistical criteria.[18] Alcohol use was defined as consuming at least one alcoholic drink on one or more days in the past 30 days versus no alcohol consumption during that period. Perceptions of alcohol-related health risks were assessed using the question: *"Compared to drinking no alcohol, do you think that having 1-2 alcoholic drinks per day..."* (response options: *has no effect on, decreases, increases the risk of future health problems, or don't know*). Beliefs about cancer were measured by the question: *"How worried are you about getting cancer?"* with response options categorized as *not at all/slightly, somewhat,* or *moderately/extremely*.

Covariates. We included selected sociodemographic characteristics as covariates: Age in years (18-34, 35-49, 50-64, 65-74, ≥75), sex (male, female), race/ethnicity (non-Hispanic White, non-Hispanic Black, Hispanic, non-Hispanic Asian, and non-Hispanic other). *Note*: "non-Hispanic other" included American Indian or Alaska Native, Native Hawaiian, Guamanian or Chamorro, Samoan, and Other Pacific Islander.

The other covariates included: Education (up to high school, some college/post-high school, college graduate, and postgraduate), household income (<$20,000; $20,000 to $34,999; $35,000 to $49,999; $50,000 to $74,999; and ≥$75,000), and place of residence (urban, rural).

Using sociodemographic characteristics as covariates controlled for confounding, as these variables may be associated with both the exposure and the outcome. Adjusting for them allowed for a more accurate estimation of the true effect of the main variable of interest. This approach also increased the precision of the estimates and strengthened the validity of the results.[19,20]

Missing Data. To address small-sample bias and potential separation due to outcome imbalance, Firth's penalized likelihood logistic regression was applied. It is a statistical method designed to address issues of bias and separation in standard logistic regression, especially when sample sizes are small, or outcome events are rare. It uses penalized maximum likelihood estimation to produce more reliable and stable estimates.[21] In addition, missing data were assumed to be missing at random (MAR), and model estimation was carried out using maximum likelihood under this assumption.[22] Together, these methods yielded robust parameter estimates and standard errors.

Statistical Analysis. A three-stage, survey-weighted analytic approach was used. First, a survey-weighted univariate analysis described distributions of study variables using survey-weighted frequencies and percentages for categorical variables, and survey-weighted means for continuous variables. Second, a survey-weighted bivariate analysis examined associations between reported negative health consequences of alcohol use and predictor variables (age, sex, educational level, race/ethnicity, residence) using cross-tabulations and chi-square tests. Confidence intervals (95%) were calculated for all proportions.

Third, a survey-weighted multivariable logistic regression identified independent predictors of being advised about alcohol-related negative health consequences, adjusting for potential confounders. Model performance was assessed using receiver operating characteristic (ROC) curve analysis. Odds ratios (ORs) with 95% confidence intervals (95% CIs) were reported. A p-value <0.05 (two-tailed) was considered statistically significant. All analyses accounted for the complex survey design through stratification using the provided stratum variable. Analyses were conducted using SAS® version 9.4 (SAS Institute Inc., Cary, NC) in July 2025.

RESULTS

Demographic Information. Data from 6,252 respondents were included in the study. Table 1 presents the demographic characteristics of the sample. The mean age of respondents was 55.6 years (standard deviation = 17.4). Of the total respondents, 56.5% were women, 51.2% were non-Hispanic White, 50.0% had no less than a college education, 42.0% were married, and the majority (87.0%) resided in urban areas.

As shown in Table 2, only 26.1% of respondents reported receiving counseling from a health care professional about the negative health consequences associated with alcohol use. Among those who received such guidance, 62.1% were informed about multiple health consequences, while only 10.9% were specifically counseled about liver disease.

Table 1. Respondent characteristics, HINTS 2022 (N = 6,252).

Characteristics	N (%)
Sex	
Male	2,307 (36.9)
Female	3,535 (56.5)
Missing	410 (6.6)
Age, years	
Mean (SD)	55.6 (17.4)*
Age group	
18-34	939 (15.0)
35-49	1,240 (19.8)
50-64	1,772 (28.3)
65-74	1,356 (21.7)
≥75	847 (13.5)
Missing	98 (1.6)
Educational level	
Up to high school	1,455 (23.3)
Post high school/some college	1,672 (26.7)
College graduate	1,613 (25.8)
Postgraduate	1,108 (17.7)
Missing	404 (6.5)
Household income	
<$20,000	959 (15.3)
$20,000 to <$35,000	729 (11.7)
$35,000 to <$50,000	732 (11.7)
$50,000 to <$75,000	937 (15.0)
≥75,000	2,163 (34.6)
Missing	732 (11.7)
Race/Ethnicity	
Non-Hispanic White	2,303 (51.2)
Non-Hispanic Black or African American	889 (14.2)
Hispanic	1,001 (16.0)
Non-Hispanic Asian	288 (4.6)
Non-Hispanic Other	184 (2.9)
Missing	687 (11.0)
Marital status	
Married	2,624 (42.0)
Living as married or living with a romantic partner	373 (6.0)
Divorced	939 (15.0)
Widowed	646 (10.3)
Separated	136 (2.2)
Single, never been married	1,119 (17.9)
Missing	415 (6.6)
Place of residence	
Rural	811 (13.0)
Urban	5,441 (87.0)

Note: HINTS, Health Information National Trends Survey.
*Mean (standard deviation).

Results of Bivariate Analysis. Counseling rates were notably lower among certain groups, including men (12.3%), individuals with postgraduate education (5.0%), rural residents (3.1%; Figure 1a), non-Hispanic Asian individuals (1.7%), and adults aged 75 and older (5.0%; Figure 1b).

Table 2. Respondents advised about the negative health consequences of alcohol use, HINTS 2022.

Negative Health Consequences Associated with Alcohol Use	N (%)
In the past 12 months, have you heard about the negative health consequences of drinking alcohol from doctors or other health care professionals?	
Yes	1,633 (26.1)
No	3,898 (62.3)
I have not had any medical appointments in the past 12 months	357 (5.7)
Missing	364 (5.8)
Type of negative health consequences	*n* = 1633
Alcoholism	122 (7.5)
Cancer	33 (2.0)
Diabetes	78 (4.8)
Heart disease	61 (3.7)
Liver disease	178 (10.9)
Multiple health consequences	1,014 (62.1)
Missing	147 (9.0)

Note: HINTS, Health Information National Trends Survey.

Results of Multivariable Analysis. In the survey-weighted multivariable logistic regression analysis (Table 3), several factors significantly were associated with higher odds of receiving counseling from a health care professional about the negative health consequences of alcohol use. These included: drinking more than one alcoholic beverage per week (OR = 1.40; 95% CI, 1.22-1.61); believing that drinking 1-2 alcoholic beverages per day has no impact on future health problems (OR = 2.10; 95% CI, 1.49-2.83); age 18-34 years (OR = 2.43; 95% CI, 1.84-3.21); having a high school diploma or less (OR = 1.29; 95% CI, 1.03-1.54); identifying as non-Hispanic Black (OR = 1.45; 95% CI, 1.20-1.75); and having an annual household income below $20,000 (OR = 1.27; 95% CI, 1.02-1.59). Conversely, being somewhat worried about getting cancer (OR = 0.67; 95% CI, 0.59-0.79) and being a woman (OR = 0.67; 95% CI, 0.59-0.77) were associated with lower odds of receiving counseling.

Table 3. Factors associated with negative consequences of drinking alcohol, HINTS 2022.

	In the past 12 months, have you heard about the negative health consequences of drinking alcohol from doctors or other health care professionals?		
	Yes vs No		
Variable	**OR (95% CI)**	**Standard Error**	**P value**
Intercept		0.1657	<.0001
During the past 30 days, how many days per week did you have at least one drink of any alcoholic beverage?			
At least 1 vs 0 day	1.40 (1.20-1.61)	0.07	<.0001
Compared to drinking no alcohol, do you think that having 1-2 alcoholic drinks per day...			
Has no effect vs decreases the risk of future health problems	2.10 (1.49-2.83)	0.16	<.0001
Increases vs decreases the risk of future health problems	1.26 (1.02-1.55)	0.11	0.0288
Don't know vs decreases the risk of future health problems	1.89 (1.61-2.21)	0.08	<.0001
How worried are you about getting cancer?			
Somewhat vs not at all/slightly	0.67 (0.57-0.79)	0.08	<.0001
Moderately/extremely vs not at all/slightly	0.81 (0.67-0.96)	0.09	0.0147
Age, y			
18-34 vs ≥75	2.43 (1.84-3.21)	0.14	<.0001
35-49 vs ≥75	1.96 (1.51-2.57)	0.14	<.0001
50-64 vs ≥75	1.91 (1.52-2.57)	0.13	<.0001
65-74 vs ≥75	1.44 (1.11-1.88)	0.13	0.0064
Sex			
Female vs Male	0.67 (0.59-0.77)	0.07	<.0001
Educational level			
Up to high school vs postgraduate	1.29 (1.03-1.54)	0.12	0.0251
Post high school/some college vs postgraduate	1.26 (1.03-1.53)	0.10	0.0238
College graduate vs postgraduate	0.99 (0.83-1.22)	0.10	0.9404
Race and ethnicity			
Non-Hispanic Black vs Non-Hispanic White	1.45 (1.20-1.75)	0.10	0.0001
Hispanic vs Non-Hispanic White	1.39 (1.16-1.67)	0.09	0.0005
Non-Hispanic Asian vs Non-Hispanic White	1.37 (1.02-1.84)	0.15	0.0355
Non-Hispanic other vs Non-Hispanic White	0.97 (0.67-1.41)	0.19	0.8726
Annual income, $			
<20,000 vs ≥75,000	1.27 (1.02-1.59)	0.11	0.0362
20,000 to <35,000 vs ≥75,000	1.08 (0.87-1.39)	0.12	0.3779
35,000 to <50,000 vs ≥75,000	1.14 (0.92-1,42)	0.11	0.2425
50,000 to <75,000 vs ≥75,000	1.09 (0.90-1.32)	0.10	0.3690
Place of residence			
Rural vs Urban	0.93 (0.76-1.14)	0.11	0.5217

Note: HINTS, Health Information National Trends Survey; OR, odds ratio.
c-Statistics: 0.65. This measured the model's ability to discriminate between observations with different outcomes.

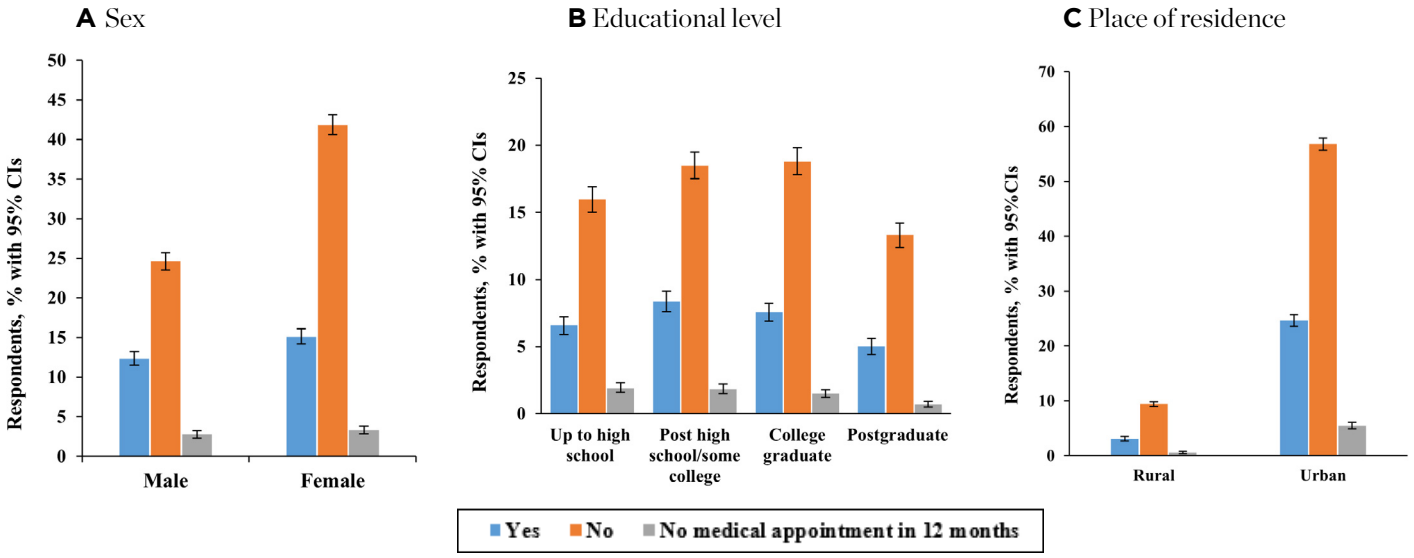

Figure 1a. Distribution of negative health consequences of drinking alcohol in the U.S. adult population, HINTS 2022.
Responses are shown to the following question: *In the past 12 months, have you heard about the negative health consequences of drinking alcohol from doctors or other healthcare professionals?* Error bars indicate 95% CIs from Chi-square tests.

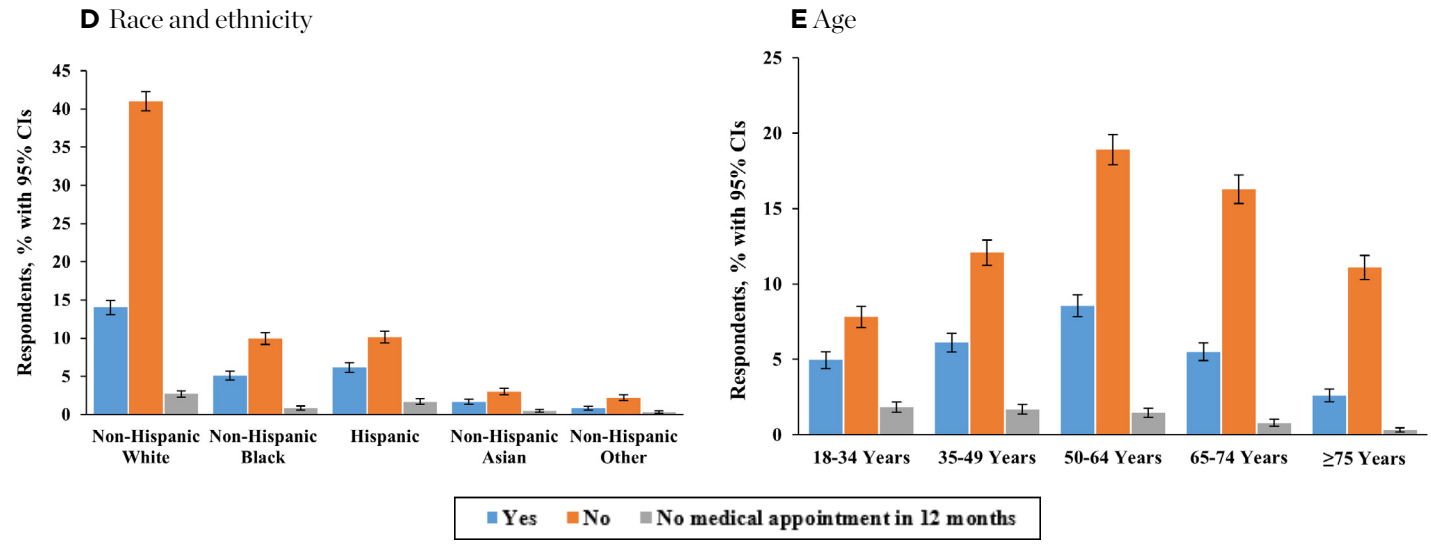

Figure 1b. Distribution of negative health consequences of drinking alcohol in the U.S. adult population, HINTS 2022.
Responses are shown to the following question: *In the past 12 months, have you heard about the negative health consequences of drinking alcohol from doctors or other healthcare professionals?* Error bars indicate 95% CIs from Chi-square tests. The classification "non-Hispanic Other" includes the following race groups: American Indian or Alaska Native, Native Hawaiian, Guamanian or Chamorro, Samoan, and Other Pacific Islander, who reported their ethnicity as non-Hispanic.

DISCUSSION

The findings reveal a substantial gap in preventive counseling on alcohol use, with only 26.1% of United States adults reporting that they received alcohol-related counseling from a health care professional. While the majority of those counseled (62.1%) were informed about multiple health consequences, only a small fraction (10.9%) was specifically counseled about liver disease, despite it being a well-established alcohol-related condition.[1,10,23] Counseling rates were notably lower among certain groups, including men, non-Hispanic Asian individuals, older adults (≥75 years), those with postgraduate education, and rural residents. These disparities suggest that key populations at risk may be overlooked in clinical settings, either due to provider bias, assumptions about risk, or gaps in screening protocols.

The multivariable analysis further clarified predictors of counseling. Individuals who drank more than one alcoholic beverage per week and those who held the misconception that moderate drinking has no health impact were more likely to receive counseling. This may reflect targeted efforts by providers toward individuals with evident risk behaviors or misinformed health beliefs.[24] Younger adults (18-34), individuals with lower educational attainment, non-Hispanic Black respondents, and those with lower income also had higher odds of receiving counseling, which may reflect both risk-based screening and targeted outreach.[12,25]

Conversely, women and individuals who expressed concern about developing cancer were less likely to receive alcohol-related counseling. This trend may represent missed opportunities in populations that are already health-conscious or perceived as lower risk.

Taken together, these findings highlight the need for more consistent and equitable delivery of alcohol-related counseling across demographic groups. Standardizing brief counseling in primary care, regardless of age, gender, or perceived risk, could reduce disparities and improve population health outcomes.

Significant public health efforts are underway to address alcohol misuse. One key initiative is SBIRT (Screening, Brief Intervention, and Referral to Treatment), supported by the Substance Abuse and Mental Health Services Administration (SAMHSA). SBIRT promotes early identification and intervention for individuals at risk through structured screening tools, patient-centered brief interventions, and timely referrals to treatment when necessary. This approach has been shown to reduce harmful alcohol consumption and support healthier long-term outcomes.[26,27]

Strengths. The study has several strengths that improve generalizability. First, the study utilized data from the HINTS, a well-established, population-based survey designed to reflect the adult United States population. The inclusion of diverse respondents across age, sex, race/ethnicity, education, income, and geographic location strengthens the ability to generalize findings to the broader United States adult population. Second, with 6,252 respondents, the sample provides adequate statistical power and reflects a broad range of sociodemographic and behavioral characteristics, improving the reliability and applicability of subgroup analyses. Finally, the use of real-world, self-reported health communication practices reflects actual interactions between health care professionals and patients. This enhances the relevance of the results to clinical and public health settings.

Limitations. First, outcomes such as whether alcohol-related health consequences were discussed relied on respondent recall, making them subject to recall and social desirability bias. Misreporting could affect the accuracy of prevalence estimates. Second, certain questions are absent from HINTS that could provide additional insights. Most notably, the survey does not ask whether patients have a usual source of care. Continuity of care relationships may be important predictors of alcohol use counseling, but the current dataset cannot address this factor. Third, the cross-sectional design captures a single point in time and does not permit causal inference; longitudinal data would be required to assess temporal changes or behavioral impacts.

Fourth, the survey included only non-institutionalized United States adults, potentially underrepresenting populations in long-term care, correctional facilities, or unstable housing who may face higher alcohol-related risks. Fifth, counseling reports were not validated against clinical records, nor were provider perspectives assessed, limiting insight into drivers of disparities or the influence of provider characteristics. Sixth, the model's c-statistic of 0.65 indicates only modest discrimination, raising concerns about predictive accuracy, generalizability, and clinical utility. Finally, while findings may apply within the United States, generalizability to other countries with different healthcare systems, policies, or cultural norms regarding alcohol is limited.

CONCLUSIONS

Despite the known health risks of alcohol use, fewer than one in three United States adults reported receiving counseling from a health care professional, with significant variation across demographic groups. Individuals at higher behavioral or socioeconomic risk were more likely to receive such guidance, while others, such as women, older adults, and rural residents, were less likely to be counseled. These disparities suggest missed opportunities for prevention and underscore the need for standardized, equitable approaches to alcohol-related counseling in clinical practice. Expanding routine screening and integrating brief interventions into primary care could ensure that all patients receive appropriate, evidence-based guidance on alcohol use and its negative health consequences.

ACKNOWLEDGEMENTS

The authors appreciate the data provided by the National Cancer Institute from the Health Information National Trends Survey.

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Keywords: Alcohol Drinking, Health Education, Counseling, Primary Health Care, Socioeconomic Disparities in Health

Conflicting and Competing Interests: Samuel Ofei-Dodoo is the Editor-in-Chief for the *Kansas Journal of Medicine*.
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KANSAS JOURNAL of MEDICINE

Brief Report

Chronic Suicidality in Youth Admitted for Mental Health Emergencies: A Retrospective Chart Review

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Received Feb. 13, 2025; Accepted for publication Aug. 20, 2025; Published online Oct. 15, 2025
Kans J Med 2025 Sep-Oct; 18:111-114. https://doi.org/10.17161/kjm.vol18.23589

ABSTRACT

Introduction. Suicide is a leading cause of death among youth in the United States. Most youth who attempt suicide have underlying mental health disorders, which account for approximately 10% of pediatric hospitalizations. Researchers hypothesized that children with chronic suicidality (CS) have more suicide-related risk factors, attempt suicide with greater lethality, and have more pre-existing mental health diagnoses compared to those without chronic suicidality (Non-CS).

Methods. The study team reviewed pediatric hospitalizations related to suicide at Wesley Medical Center from 2016 to 2021. CS was defined as a reported history of, or prior hospitalization for, suicide-related behavior. The severity of suicidal ideation/behavior and actual lethality or medical damage was measured using the Columbia-Suicide Severity Rating Scale (C-SSRS).

Results. Of 375 patients, 253 were classified as CS and 122 as Non-CS. Age and race distributions were similar between groups. Females were more likely to have CS ($p = 0.0006$). Patients with CS were more often admitted for suicide attempts rather than non-suicidal self-injury ($p = 0.0171$). No significant differences were found in method or lethality of attempts.

Patients with CS experienced more peer stress, abuse, legal problems, and job-related issues (all $p < 0.05$). No differences were observed in other stressors. CS patients had more prior mental health treatment ($p < 0.0001$) and were more frequently discharged to inpatient mental health care ($p < 0.0001$).

Conclusions. Female gender and psychosocial stressors were associated with increased risk of chronic suicidality in youth. Early identification of these factors may enable earlier interventions to prevent suicide-related behaviors.

INTRODUCTION

Pediatric mental health concerns are on the rise, with 16.5% of youth in the United States meeting criteria for a mental health disorder.[1] However, only half of these youth receive counseling or treatment.[1] Workforce maps from the American Academy of Child and Adolescent Psychiatry highlight significant disparities, showing a shortage of child and adolescent psychiatrists (CAPs) in Kansas.[2] Nationally, there are approximately 14 CAPs per 100,000 children, while Kansas falls below that average, with only 10 per 100,000.[2] As a result, fewer than 35% of Kansas youth experiencing major depressive episodes receive any mental health treatment, and only 27% of those with severe symptoms receive consistent care.[3] The lack of appropriate diagnostic and treatment resources contributes to worsening outcomes.

Youth suicide increased significantly between 2001 and 2021, accounting for nearly 20% of deaths among high school-aged adolescents and becoming the second-leading cause of death in this age group.[4-6] According to the Centers for Disease Control and Prevention (CDC)'s Youth Risk Behavior Surveillance System (YRBSS), trends from 2013 to 2023 show a decrease in substance use among students but an increase in experiences of violence, poor mental health, and suicidal thoughts and behaviors.[7,8] Notably, 39.7% of students reported persistent sadness or hopelessness, 28.5% reported poor mental health, 20.4% seriously considered suicide, and 9.5% attempted suicide in the past year.

While females have higher rates of suicide attempts, males have higher rates of suicide death.[9] Risk factors in adolescents include pre-existing mental health disorders, prior suicidal or self-injurious behavior, impulsivity, family history of suicide or self-harm, access to lethal means, and adverse childhood experiences (ACEs).[10]

During the COVID-19 pandemic, emergency department (ED) volumes decreased overall, but mental health-related visits rose proportionally.[11-13] Many patients faced delays due to strained healthcare systems. Psychiatric boarding times in EDs more than doubled, with many youths waiting over two days for care.[14] In response, multiple professional organizations jointly declared a national state of emergency in child and adolescent mental health.[2,15]

Mental health issues account for 10% of youth hospital admissions,[16] but this rate has been rising. From 2007 to 2014, hospitalizations related to suicide, self-injury, and other psychiatric conditions increased fivefold, outpacing increases in all-cause pediatric hospitalizations.[17] Youth also are at particularly high risk for repeat suicide-related admissions.[18] Although mental health interventions have been shown to be effective, identifying at-risk individuals remains difficult, as fewer than half of youth who die by suicide had received prior psychiatric care.[19]

Despite the urgent need, data identifying risk factors for repeat suicide attempts are limited. The aim of this study was to delineate key differences in risk factors between adolescents with chronic suicidality (CS) and those without chronic suicidality (Non-CS) at a mid-sized metropolitan community hospital. The analysis included existing data collected in 2021 as part of a larger project. We hypothesized that adolescents with CS would exhibit more risk factors, attempt suicide with greater lethality and medical harm, and have higher rates of pre-existing mental health diagnoses and treatment compared to Non-CS peers.

METHODS

The researchers conducted a retrospective chart review of youth aged 7 to 17 years who were hospitalized for suicide-related behaviors at Wesley Medical Center (WMC) in Wichita, Kansas, between 2016 and 2021. This review was part of a larger project aimed at assessing trends and characteristics of pediatric mental health admissions to Wesley Children's Hospital during that time.

Suicide-related behaviors included preparatory acts, aborted and interrupted suicide attempts, actual suicide attempts, non-suicidal self-injury, suicidal ideation, and non-suicidal intoxication. Patients admitted for non-suicide-related mental health conditions or for conditions unrelated to mental health were excluded.

Classification into CS or Non-CS was based on patient-reported history or prior hospitalization for suicide-related behavior. CS was defined as having multiple admissions to WMC during the study period, a history of inpatient psychiatric admissions, or a history of suicide-related behavior. Lethality was assessed using the "Actual Lethality/Medical Damage" definitions from the Columbia-Suicide Severity Rating Scale (C-SSRS).[20,21]

Study data were collected and managed using REDCap® (Research Electronic Data Capture), hosted at The University of Kansas Medical Center.[22,23] Statistical analyses were performed using GraphPad Prism 10. Data were grouped into CS and Non-CS categories. Continuous variables were evaluated for normality; t-tests were used for parametric data, and Shapiro-Wilk tests for non-parametric data. Categorical variables were analyzed using Pearson Chi-square or Fisher's exact tests, with statistical significance set at an alpha level of 0.05.

This study was deemed exempt by the institutional review boards (IRBs) at both HCA HealthOne and The University of Kansas Medical Center.

Table 1. Actual lethality/medical damage score. Adapted from the C-SSRS.

Score	Definition	Examples
1	No physical damage or very minor physical damage	Surface scratches
2	Minor physical damage	Lethargic speech; first-degree burns; mild bleeding, sprains
3	Moderate physical damage: medical attention needed	Conscious but sleepy, somewhat responsive; second-degree burns; bleeding of major vessel
4	Moderately severe physical damage: medical hospitalization and likely intensive care required	Comatose with reflexes intact; third-degree burns less than 20% of body; extensive blood loss but can recover; major fractures
5	Severe physical damage: medical hospitalization with intensive care required	Comatose without reflexes; third-degree burns over 20% of body; extensive blood loss with unstable vital signs; major damage to a viral area
6	Death	

RESULTS

This study included 375 patients, of whom 253 (67.47%) were classified as having CS. No significant age differences were observed between the CS and Non-CS groups.

Patients with CS were more likely to be admitted for suicidal behavior, rather than for non-suicidal self-injury, suicidal thoughts, or non-suicidal intoxication, compared to Non-CS patients (CS: 185 [73.12%], Non-CS: 74 [60.66%], p = 0.0171). The mean lethality score was numerically higher in the CS group (2.09) compared to the Non-CS group (1.89), though the difference was not statistically significant (p = 0.2031).

There were no significant differences between groups in terms of race, length of hospitalization, or method of suicide-related event. Ingestion was the most common method in both groups, accounting for approximately 80% of cases. The CS group had a higher proportion of female patients and included all transgender individuals in the cohort (p = 0.0006; Table 2).

The most frequently reported life stressors were related to family, school, significant others, and abuse (Figure 1). Patients in the CS group were significantly more likely to report specific stressors, including:

- Friend problems (CS: 44 [28.76%], Non-CS: 11 [9.02%], p <0.0001)
- Sexual abuse (CS: 85 [33.60%], Non-CS: 14 [11.48%], p <0.0001)
- Physical abuse (CS: 62 [24.51%], Non-CS: 13 [10.66%], p = 0.0015)
- Emotional abuse (CS: 53 [20.95%], Non-CS: 11 [9.02%], p = 0.0034)
- Legal problems (CS: 40 [15.81%], Non-CS: 8 [6.56%], p = 0.0128)
- Job problems (CS: 6 [3.92%], Non-CS: 0 [0%], p = 0.0355)

Patients with CS also were significantly more likely to have a prior history of mental health treatment (CS: 168 [66.40%], Non-CS: 38 [31.15%], p <0.0001).

Discharge plans also differed significantly between groups (p <0.0001). Patients with CS were more frequently discharged to acute inpatient psychiatric hospitals (CS: 165 [65.21%], Non-CS: 52 [42.62%]), while Non-CS patients were more often discharged home with outpatient services (CS: 67 [26.48%], Non-CS: 62 [50.82%]) or without services (CS: 4 [1.58%], Non-CS: 4 [3.28%]). Additionally, seven patients in the CS group (2.77%) were discharged to psychiatric residential treatment facilities, compared to none in the Non-CS group.

Table 2. Demographics and event characteristics.

Variable	CS n = 253	Non-CS n = 122	P value
Age at admission (yr)	15.37 (14.07, 16.59)	15.45 (14.27, 16.87)	0.3990
Gender			0.0006
Male	40 (15.81%)	40 (32.79%)	
Female	203 (80.24%)	82 (67.21%)	
Transgender MTF	1 (0.40%)	0 (0)	
Transgender FTM	4 (1.58%)	0 (0)	
Nonbinary	0 (0)	0 (0)	
Not specified	5 (1.98%)	0 (0)	
Race			0.4997
White	202 (79.84%)	92 (75.41%)	
Hispanic	6 (2.37%)	3 (2.46%)	
Black	23 (9.09%)	12 (9.84%)	
Asian	3 (1.19%)	0	
Hawaiian/Islander	2 (0.79%)	0	
Other/not reported	16 (6.32%)	15 (12.30%)	
Length of stay (hr)	30.00 (20.00, 46.50)	32.50 (20.00, 43.00)	0.9607
Method of event			0.2898
Ingestion	206 (81.42%)	97 (79.51%)	
Firearm	1 (0.40%)	0	
Hanging	6 (2.37%)	2 (1.64%)	
Suffocation	5 (1.98%)	1(0.82%)	
Cutting	26 (10.28%)	7 (5.74%)	
Other	14 (5.53%)	7(5.74%)	
No event	15 (5.93%)	15 (12.30%)	
Suicide attempt n (%)	185 (73.12%)	74 (60.66%)	0.0171
Lethality	2.09±1.42	1.89 ± 1.38	0.2031
Prior mental health treatment	168 (66.40%)	38 (31.15%)	<0.0001

Note: Continuous data reported as mean ± standard deviation for normally distributed data and median (interquartile range) for non-normally distributed data. Statistical significance has an alpha of 0.05. Gender was determined from chart documentation of patient's reported gender. Abbreviations: CS, chronic suicidality; Non-CS, without chronic suicidality; MTF, male to female, transgender female; FTM, female to male, transgender male.

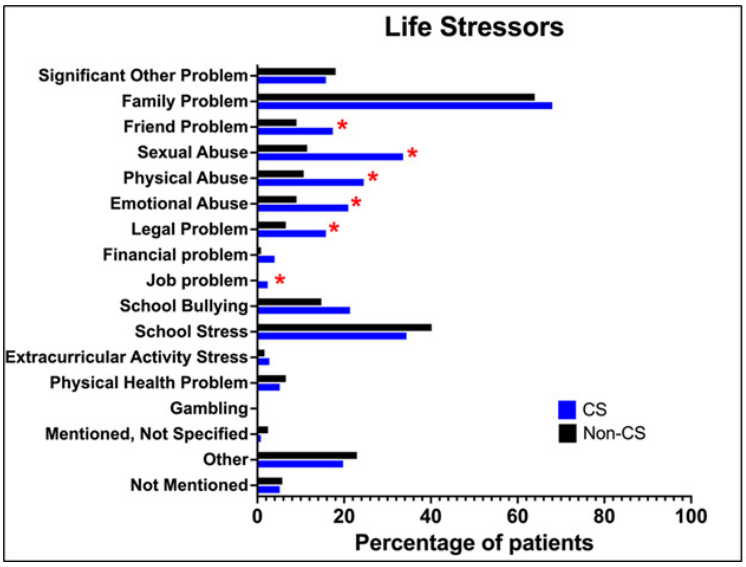

Figure 1. Life stressors of adolescents with chronic suicidality (CS) and without chronic suicidality (Non-CS).
*Indicates significant difference between CS and Non-CS. Statistical significance has an alpha set at 0.05.

DISCUSSION

WMC experienced a high volume of pediatric admissions for mental health emergencies during the study period. A substantial proportion of these patients exhibited CS. By comparing youth with CS to Non-CS, we identified important trends that may inform clinical assessment and intervention strategies.

Patients in the CS group were significantly more likely to have experienced physical, sexual, and emotional abuse. They also had higher rates of previous mental health diagnoses and treatment. These findings are consistent with prior literature. The ACEs study demonstrated that such experiences increase the risk of suicide attempts two- to five-fold, with a graded relationship between cumulative ACE score and suicide risk across the lifespan.[24] Additionally, research in military populations has shown that individuals with multiple suicide attempts are more likely to report childhood sexual abuse and prior mood disorders,[25] further supporting the association between early trauma and CS. This study adds to a growing body of evidence linking adverse childhood experiences to repeated suicide-related behavior.

Length of hospital stay did not significantly differ between CS and Non-CS groups, averaging approximately 30 hours. This is shorter than national averages reported in a multicenter study, which found a typical stay of four days at high-volume hospitals and two days at lower-volume hospitals.[26] In our study, a higher proportion of CS patients were discharged to acute inpatient psychiatric facilities, whereas more Non-CS patients were discharged home, with or without outpatient services. The similarity in length of stay across groups may be related to regional limitations in psychiatric facility availability during the COVID-19 pandemic. Local clinicians reported extended hospitalizations due to limited inpatient bed access. Although the current study did not explicitly evaluate pandemic-related impacts, future research could compare pre- and post-pandemic hospitalization patterns. However, changes in institutional data-sharing policies may limit access to post-pandemic datasets.

Strengths and Limitations. A major strength of this study is the inclusion of all pediatric mental health admissions at a major regional hospital over a six-year period. The use of the C-SSRS allowed for systematic stratification of suicidality, enhancing the reliability of comparisons between CS and Non-CS groups. This approach offers valuable insight into youth mental health in Kansas beyond state agency reports or school-based surveys.

However, the study has limitations. It relied on patient self-reports and medical chart documentation, both of which may introduce reporting bias or inconsistency. Also, because the dataset was limited to a single hospital, the analysis may not account for care received elsewhere. The study period, ending in 2021, limits the generalizability of findings to the current post-pandemic context.

CONCLUSIONS

This study underscores the importance of comprehensive screening for suicidality in adolescents. While screening tools such as the Patient Health Questionnaire-9 (PHQ-9) are widely used, they may be insufficient. Prior research indicates that approximately 30% of adolescents who later attempt suicide score zero on the PHQ-9 question regarding thoughts of death or self-harm within the preceding 30-90 days.[27] For

patients with CS, screening strategies that include broader risk factors, such as trauma history, peer conflict, and prior mental health treatment, may enhance detection and support early intervention. These efforts may help reduce the risk of suicide-related behaviors, injury, and death among both CS and Non-CS youth.

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Keywords: adolescent, mental health, suicide

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KANSAS JOURNAL of MEDICINE

Brief Report

Contraceptive Knowledge and Counseling among OB-GYN and Family Medicine Physicians

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Received May 9, 2025; Accepted for publication Aug. 28, 2025; Published online Oct. 15, 2025
Kans J Med 2025 Sep-Oct; 18:115-118. https://doi.org/10.17161/kjm.vol18.23954

ABSTRACT

Introduction. Few studies have examined contraceptive knowledge and counseling confidence among primary care residents and physicians. Authors of this study evaluated education, knowledge, and counseling practices related to contraception among physicians in obstetrics and gynecology (OB-GYN) and family medicine (FM).

Methods. In this prospective, cross-sectional study, current OB-GYN and FM residents, as well as program graduates from the past five years at a single institution, were surveyed. The survey assessed demographics, contraception knowledge, provider confidence, counseling practices, and procedural experience. Responses were included in the analysis if at least one knowledge question was completed.

Results. The final analysis included 45 respondents (8% response rate): 33.3% (n = 15) from FM and 66.7% (n = 30) from OB-GYN. Average knowledge scores did not differ significantly between FM (60%, 12/20) and OB-GYN physicians (70%, 14/20). Attending physicians' average scores were significantly higher (85%, 17/20) than residents (60%, 12/20; p = 0.0014). Most respondents (97.8%, n = 44) reported feeling comfortable counseling patients, and 93.3% (n = 42) felt comfortable performing procedures and prescribing contraceptives. OB-GYN physicians reported greater comfort placing levonorgestrel and Paragard® intrauterine devices (IUDs) than FM physicians (93%, n = 14 vs. 61%, n = 11; p = 0.040). More OB-GYN physicians (6.7%, n = 3) reported performing over 80 Nexplanon® insertions compared to FM physicians (0.0%, n = 0; p <0.0001).

Conclusions. Contraceptive knowledge did not differ significantly between OB-GYN and FM physicians. However, advanced training was associated with greater comfort in both prescribing and performing contraceptive procedures.

INTRODUCTION

Among United States women aged 15-44 who have ever had sexual intercourse, 99% have used at least one method of birth control,[1] and 65% of sexually active women aged 18-49 are currently using contraception.[2] Birth control methods differ in effectiveness, ease of use, and side effect profiles.

Affiliation with Ryan programs and participation in family planning rotations have been shown to improve medical residents' knowledge and skills in contraceptive care and counseling.[3] However, family planning education is not consistently incorporated across all primary care residency programs. In one study, 93% of surveyed primary care physicians agreed that contraception is an important component of preventive care, yet only 73% felt well-educated to prescribe it, 43% felt confident prescribing emergency contraception, and just 16% reported being able to insert an intrauterine device (IUD).[4] These findings suggest that while physicians recognize the importance of contraception, many lack the necessary knowledge or procedural skills. Another study found significant misinformation among providers, particularly about IUDs, which further undermines their comfort and confidence in prescribing.[5]

Recent legal developments, including the Supreme Court decision in *Dobbs v. Jackson Women's Health Organization*, also have significantly affected contraceptive access.[3] Given that primary care physicians are uniquely positioned to provide contraceptive counseling, it is important to assess their knowledge and confidence in prescribing contraception.

Authors of this study evaluated the contraceptive education of current residents and recent graduates, focusing on their knowledge, comfort, and confidence in prescribing contraception, counseling patients, and performing IUD and implant placements.

METHODS

Participants. Eligible participants were residents who graduated between 2019 and 2023 from family medicine (FM), obstetrics and gynecology (OB-GYN), internal medicine, or pediatrics residency programs at a single teaching institution. Exclusion criteria included study investigators, preliminary internal medicine residents, and residents who entered subspecialties outside of primary care.

Instrument. Authors of this prospective study used a cross-sectional, 52-question survey covering:

1. Demographics: including residency year or post-residency status to assess training advancement.
2. Medical school background: including contraception curriculum coverage.
3. Residency training: curriculum coverage, counseling experience, use of different contraceptive methods, and any program restrictions.
4. Information resources: sources used for contraception information.
5. Practice patterns: comfort, confidence, and preferences in prescribing various contraceptive methods.
6. Procedural experience: self-reported numbers of IUD and Nexplanon® placements.
7. Knowledge assessment: 20 questions on contraceptive management in specific scenarios (see supplemental content; available online at journals.ku.edu/kjm).

The survey has not been previously published or externally validated but was pilot tested with individuals from diverse educational and medical backgrounds to ensure clarity and accuracy. Some items were adapted from a prior study on contraceptive recommendations.[6]

Procedures. The study was approved by the local institutional review board (IRB). Surveys were administered electronically, with one residency program receiving paper copies. Data collection occurred from January to February 2022 and April 10 to May 16, 2023. Electronic surveys were hosted in REDCap® (Research Electronic Data Capture), a secure, web-based application hosted by The University of Kansas Medical Center.[7,8] Participants received two reminder emails within a two-week period, each containing a survey link.

Statistical Analysis. Analyses were conducted in SAS® version 9.4 (SAS Institute Inc., Cary, NC). Categorical variables were reported as frequencies and percentages; continuous variables were summarized as means with standard deviations or medians with interquartile ranges (IQR), as appropriate. Associations between categorical variables were tested using likelihood ratio chi-square or Fisher's exact tests. Penalized Firth logistic and multinomial logistic regression models with appropriate link functions were used to examine associations between factors and specific preferences. All tests were two-tailed, with statistical significance set at $p \leq 0.05$.

RESULTS

Out of 561 eligible participants, 45 completed the survey and were included in the final analysis (response rate: 8.0%). Of these, 33.3% (n = 15) were FM residents, and 66.7% (n = 30) were OB-GYN residents or attending physicians; 40.0% (n = 12) of OB-GYN respondents were attendings (Table 1).

Most respondents (88.9%, n = 40) did not attend a Ryan Program–affiliated medical school (Table 2). A greater proportion of FM respondents (93.3%, n = 14) reported receiving a formal medical school curriculum on contraception compared to OB-GYN respondents (66.7%, n = 20; p = 0.015).

Nearly all respondents (88.9%, n = 40) reported receiving formal contraceptive training during residency; only one OB-GYN resident disagreed. Few reported restrictions on long-acting reversible contraception: placement (4.4%, n = 2), prescribing (2.2%, n = 1), or both (2.2%, n = 1). Among post-residency respondents, 83.3% (n = 10) reported no workplace restrictions.

The American College of Obstetricians and Gynecologists (ACOG) was the most frequently cited resource for contraception information (93.3%, n = 42), followed by Centers for Disease Control and Prevention (CDC) guidelines (60.0%, n = 27).

Most respondents reported feeling comfortable with counseling (97.8%, n = 44) and prescribing contraception (93.3%, n = 42) given their responses of 'strongly agree/agree' to such survey questions, with 97.8% (n = 44) indicating they would prescribe all forms. Two OB-GYN respondents (4.4%) reported referring patients for emergency contraceptive pills, and three (6.6%), including one FM respondent, reported they would not prescribe them.

OB-GYN respondents more often reported completing >80 IUD placements (22.2%, n = 10) than FM respondents (0.0%, n = 0; p <0.0001) and >80 Nexplanon® insertions (6.7%, n = 3 vs. 0.0%, p <0.0001). Advancement in training was associated with more IUD and Nexplanon® placements (p <0.0001 for both) and greater comfort placing levonorgestrel and Paragard® IUDs (p = 0.040).

On the 20-item knowledge assessment, average scores did not differ significantly between FM (60.5%, 12.1/20) and OB-GYN respondents (69.5%, 13.9/20). However, attending physicians scored higher (87.0%, 17.4/20) than residents (58.8%, 13/20; p = 0.0014). Nearly all respondents (97.8%, n = 44) reported they could easily find reliable sources when needed.

Table 1. Respondent demographics.

Characteristics	Percent (Frequency) N = 45
Respondent Age in Years	
20 to 30	55.5% (25)
31 to 40	42.2% (19)
41 to 50	2.2% (1)
Respondent Gender	
Female	86.6% (39)
Male	13.3% (6)
Respondent Religion	
Protestant	22.3% (10)
Catholic	17.7% (8)
Other Christian	17.7% (8)
None	40% (18)
Other	2.2% (1)
Respondent Type/Year	
Resident, Postgraduate year 1-2	40% (18)
Resident, Postgraduate year 3-4	33.3% (15)
Post-Residency less than 1 year	4.44% (2)
Post-Residency 1-2 years	8.8% (4)
Post-Residency 3-4 years	13.3% (6)
Respondent Specialty	
Family Medicine (FM)	33.3% (15)
Obstetrics and Gynecology (OB-GYN)	66.6% (30)
Respondent Residency Location	
Kansas City	22.2% (10)
Wichita	77.7% (35)

Table 2. Respondent education experiences.

Characteristic	Percent (Frequency) N = 45
Medical School Location	
West Coast	2.2% (1)
Midwest	88.9% (40)
South	6.6% (3)
International medical graduate	2.2% (1)
Ryan Affiliation	
Yes	8.8% (4)
No	91.1% (41)
Restriction within Residency	
Restriction with placement of long-acting reversible contraception (LARC) only	4.4% (2)
Restriction with prescribing only	2.2% (1)
Restriction of both	2.2% (1)
No restrictions	91.1% (41)
Restriction within Workplace (attending physicians only)	
Restriction with placement of long-acting reversible contraception (LARC) only	16.6% (2)
Restriction with prescribing only	0% (0)
Restriction of both	0% (0)
No restrictions	83.3% (10)
Medical School Contraceptive Education	
Strongly Agree/Agree	77.7% (35)
Neutral	4.4% (2)
Strongly Disagree/Disagree	20% (9)
Residency Contraceptive Education	
Strongly Agree/Agree	88.9% (40)
Neutral	8.8% (4)
Strongly Disagree/Disagree	2.2% (1)

DISCUSSION

Our study found no significant difference in contraceptive knowledge between FM and OB-GYN physicians, suggesting that residency programs in Kansas provide adequate education in this area. This contrasts with the Schreiber study, which reported a significant gap between OB-GYN and FM physicians ($p = 0.02$).[4] The difference may reflect variations in study populations, our work focused on Kansas residency programs, while Schreiber surveyed physicians in Western Pennsylvania.

Knowledge differences between attending and resident physicians suggest that clinical experience plays a key role in building expertise. Despite these differences, 98% ($n = 44$) of respondents reported they could find reliable information when needed. This underscores the value of access to evidence-based resources, access that was briefly jeopardized earlier this year when the CDC's contraceptive guidelines were temporarily removed.[9] Although reinstated with some restrictions, maintaining their availability remains essential.

Both FM and OB-GYN physicians reported high confidence and comfort in contraceptive counseling and prescribing, indicating that current primary care training equips physicians to engage effectively in these conversations. Given that over 40% of unintended pregnancies are linked to contraceptive misuse, effective patient counseling is important.[10]

Our findings also suggest a potential decline in physician autonomy after residency. While 91% of residents reported no workplace restrictions, only 83% of attendings did. This may reflect greater institutional or legal barriers for practicing physicians. The *Dobbs v. Jackson Women's Health Organization* ruling already has been associated with reduced contraceptive services, likely due to state-level changes in access.[11] Continued legislative restrictions could further limit provider autonomy.

We also identified possible barriers to emergency contraceptive access. Nearly 7% of OB-GYN respondents said they would either refer patients elsewhere or not prescribe emergency contraception, lower than the national average of 15% who reported not offering any form since *Roe v. Wade* was overturned in 2022.[12] This raises questions about the factors influencing OB-GYN physicians' prescribing decisions.

Limitations. The main limitation of our study was the low response rate (8%), which may affect generalizability. However, our sample from a large academic institution may support broader applicability. Another limitation was the lack of responses from pediatric or internal medicine physicians, which may reflect less involvement in contraceptive care in those specialties. Additionally, our survey lacked external validation; while it was pilot tested internally, future use and citation could facilitate further validation.

CONCLUSIONS

Despite differences in formal education and procedural experience, respondents demonstrated high confidence and comfort in providing contraceptive care. Standardizing and expanding contraceptive education across specialties may help address remaining gaps and improve patient outcomes.

ACKNOWLEDGEMENTS

The authors would like to thank members of the Wichita Medical Research and Education Foundation for awarding our abstract with the "Outstanding Medical Student Research Award" at The University of Kansas School of Medicine-Wichita's annual Research Forum.

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Keywords: contraception, knowledge, obstetrics, gynecology

Presentations: This study was presented as an oral presentation at The University of Kansas School of Medicine-Wichita Research Forum on April 17, 2025, in Wichita, Kansas. As a result, the conference abstract was published previously as a conference proceeding in the *Kansas Journal of Medicine*.
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KANSAS JOURNAL of MEDICINE

Case Report

WATS-3D-Only Surveillance and Band Ligation in Cirrhosis with Barrett's Esophagus: A Case Report

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Received May 11, 2025; Accepted for publication Aug. 15, 2025; Published online Oct. 15, 2025
Kans J Med 2025 Sep-Oct; 18:119-120. https://doi.org/10.17161/kjm.vol18.23959

INTRODUCTION

Barrett's esophagus (BE) is a well-recognized complication of chronic gastroesophageal reflux disease (GERD) and an established precursor to esophageal adenocarcinoma. It arises when chronic acid exposure induces metaplastic transformation of the distal esophagus, replacing the normal squamous epithelium with specialized columnar epithelium containing goblet cells.[1]

Traditionally, BE screening has relied on endoscopic examination with Seattle Protocol 4-quadrant cold forceps biopsies (CFB) of abnormal-appearing mucosa.[2] In recent years, wide-area transepithelial sampling with computer-assisted 3-dimensional analysis (WATS-3D) has emerged as a complementary technique for detecting intestinal metaplasia (IM) and dysplasia.[1] This method uses an abrasive cytology brush to collect deeper glandular tissue, which is prepared on a slide, reconstructed into a high-resolution 3D image of the Barrett's glands, and reviewed by a pathologist.[1]

Multiple studies suggest that combining WATS-3D with CFB improves detection of IM and dysplasia compared with CFB alone.[2-4] Current American Society for Gastrointestinal Endoscopy (ASGE) guidelines support its use as an adjunct to Seattle Protocol biopsies, albeit with a conditional recommendation and low-quality evidence.[5] Conversely, the 2022 American College of Gastroenterology guidelines found insufficient evidence to recommend for or against WATS-3D.[1]

An important gap in the literature exists for patients with decompensated cirrhosis and esophageal varices (EV). In these cases, CFB often is avoided due to bleeding risk, potentially leaving BE undiagnosed.[6] Moreover, no guidelines address the role of WATS-3D-only surveillance in this high-risk population.

We present a case in which WATS-3D-only surveillance, combined with band ligation, facilitated the detection and management of BE that had progressed to high-grade dysplasia (HGD) in a patient with decompensated alcoholic cirrhosis and EV.

CASE REPORT

We report a 66-year-old man with nondysplastic (ND) BE, classified by the Prague criteria as C0-M1. His history included small Grade 1 esophageal varices (EV), alcoholic cirrhosis, alcohol use disorder, chronic pancreatitis, mild chronic obstructive pulmonary disease, active tobacco use, osteopenia, and gastroesophageal reflux disease. He presented for routine BE surveillance. Because of EV and associated bleeding risk, cold forceps biopsies were deferred in favor of WATS-3D sampling only.

Initial surveillance esophagogastroduodenoscopy (EGD) with WATS-3D in 2015 showed ND BE with Grade 1 EV. Findings remained ND until early 2021, when WATS-3D detected low-grade dysplasia (LGD). Four months later, repeat EGD with WATS-3D brushing and band ligation revealed HGD. Another EGD four months later showed LGD with rare HGD. Three months after that, EGD demonstrated endoscopic clearance of BE post-banding, with pathology showing ND, non-goblet cell metaplasia. Final surveillance three months later confirmed complete eradication of BE with no intestinal metaplasia.

No post-banding bleeding or other adverse events occurred. Table 1 summarizes the eight-year surveillance timeline from diagnosis to complete resolution.

DISCUSSION

To our knowledge, this is the first reported case of WATS-3D-only surveillance combined with band ligation for the management and eradication of Barrett's esophagus that progressed to high-grade dysplasia in a patient with cirrhosis and esophageal varices.

WATS-3D is increasingly recognized as an effective Barrett's esophagus surveillance and screening tool when used alongside biopsies. Although not intended as a substitute for cold forceps biopsy in the presence of visible mucosal abnormalities, WATS-3D can sample areas that might otherwise go untested. Our case demonstrates its potential as a sole surveillance modality in patients considered too high risk for standard cold forceps biopsy-based protocols. In the absence of established guidelines for WATS-3D-only surveillance, we adopted shorter sampling intervals than typically recommended to ensure the absence of dysplasia.

We acknowledge that this is a single case, limiting generalizability. Without long-term follow-up, the effect of this approach on morbidity, mortality, or transplant eligibility in cirrhotic patients with Barrett's esophagus and dysplasia remains unknown. Further research is needed to develop standardized surveillance protocols and assess long-term outcomes in this subset of patients.

CONCLUSIONS

This case highlights the need to consider alternative BE surveillance strategies in patients with decompensated cirrhosis who require optimization for potential transplant. We describe a novel application of WATS-3D-only surveillance with band ligation for dysplasia in BE with underlying esophageal varices and document the progression of a short-segment nondysplastic BE to high-grade dysplasia using WATS-3D alone.

Table 1. Chronological description of patient's surveillance esophagogastroduodenoscopy findings.

Date	Variceal Grade	Prague Score	Number of BE Islands	Sampling Done by WATS^{3D}	Pathology Findings	Banding Therapy (# of bands)
04/09/14	2	C0-M1	3	No	N/A	0
07/29/15	2	C0-M1	>3	No	N/A	0
12/23/15	1	C0-M1	>3	Yes	No dysplasia	0
06/15/16	1	C0-M1	>3	Yes	No dysplasia	0
02/08/17	2	C0-M1	>3	No	N/A	4
01/22/18	1	C0-M1	1	No	N/A	0
01/30/19	2	C0-M1	2	No	N/A	0
01/29/20	1	C0-M1	2	No	N/A	0
02/01/21	1	C0-M1	2	Yes	LGD	0
06/01/21	1	C0-M1	2	Yes	HGD	3
10/25/21	1	C0-M1	2	Yes	LGD with rare foci of HGD	2
01/25/22	1	N/A	3	Yes	Non-goblet cell metaplasia, no dysplasia	0
04/25/22	1	N/A	0	Yes	Squamocolumnar, no dysplasia or metaplasia	0

Abbreviations: Barrett's Esophagus (BE); Prague criteria Circumferential Barrett's segment (C); longest tongue of Barrett's (M); Low grade dysplasia (LGD); High grade dysplasia (HGD)

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Keywords: Barrett's esophagus, Esophageal varices, Cirrhosis

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Case Report

Concomitant Tianeptine and Alcohol Use Disorders: Diagnosis and Treatment with Buprenorphine-Naloxone

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Received Mar. 11, 2025; Accepted for publication Sep. 5, 2025; Published online Oct. 15, 2025
Kans J Med 2025 Sep-Oct; 18:121-122. https://doi.org/10.17161/kjm.vol18.23716

INTRODUCTION

Tianeptine was developed in the 20th century as an antidepressant.[1] It has been scrutinized for its uncertain mechanisms of action, with proposed pathways including the glutamate/N-methyl-D-aspartic acid system.[2,3] Classified as an atypical, non-monoaminergic antidepressant in the N06AZ group of the Anatomical Therapeutic Chemical classification system,[1] tianeptine was once believed to function as a "serotonin reuptake enhancer."[1] Current evidence, however, indicates that it acts as a full μ-opioid receptor agonist, producing opioid-like dependence and withdrawal.[4-6]

Although data remain limited,[7] tianeptine use has been associated with overdose, including fatal cases.[5,8,9] Case reports suggest that concomitant opioid use (e.g., fentanyl) may heighten overdose risk.[5,10] Its short half-life also may increase risk in older adults and patients with kidney disease.[6] Early clinical trials suggested efficacy in treating depression among Parkinson's patients, the elderly, those with post-traumatic stress disorder, and individuals with chronic alcohol use disorder.[1,11] Tianeptine is approved for use in more than 60 countries, including parts of Europe, South America, and Asia,[2,12] but it is not approved in the United States due to safety concerns.[13,14] Despite this, it remains available online and in retail outlets such as convenience stores, gas stations, and vape shops under names including *Tianaa, Zaza, Neptune's Fix, Pegasus,* and *TD Red*.[14] Several U.S. states have restricted or banned its sale,[12] and the Food and Drug Administration (FDA) has recently issued consumer and provider warnings.[13,14]

Case reports describe the use of buprenorphine-naloxone to treat tianeptine withdrawal, particularly after failed attempts with mirtazapine (likely due to its shorter half-life relative to tianeptine) and clonidine.[7,11,15] Our case is unique in that the patient also had mild alcohol use disorder per DSM-5 criteria. Notably, the patient reported increased cravings for and heavier use of tianeptine when combined with alcohol.

CASE REPORT

Our patient was a 35-year-old previously healthy male who presented to clinic seeking treatment for tianeptine dependence and mild alcohol use disorder. Two years earlier, he began using kratom (mitragynine; a μ-opioid agonist legally sold in the U.S.) for aches and pains related to his physically demanding job. Kratom initially relieved his symptoms and boosted energy, but over time the effects waned, and he developed cravings and withdrawal symptoms (e.g., flu-like illness when stopping). His use escalated to six kratom capsules, three to four times daily.

After nine months, he switched to tianeptine, which he discovered online. The initial dose relieved his pain, but tolerance developed, likely accelerated by prior kratom use, and he increased to 111 mg/day, exceeding the maximum recommended daily dose by 61 mg. He contin-ued this for 15 months. He then developed severe withdrawal symptoms (nausea, vomiting, palpitations, tremors, myalgias, abdominal pain) and sought emergency care. He reported last drinking alcohol around midnight and last using tianeptine a few hours before presentation. He also reported intermittent cannabis use and episodic heavy alcohol consumption (binge drinking, defined in men as more than five standard drinks per occasion). His vital signs and labs were unremarkable. The emergency department physician determined his symptoms were most consistent with opioid withdrawal and administered two 2-mg buprenorphine-naloxone tablets. His withdrawal resolved within six hours, and he was discharged with a seven-day prescription for 2 mg twice daily, with referral to addiction psychiatry.

At clinic follow-up, he met DSM-5 criteria for moderate opioid use disorder (cravings, withdrawal, failed attempts to cut back, tolerance, escalating dosage, continued use despite harm) and mild alcohol use disorder (desire to cut down, functional impairment, job/family strain). His alcohol consumption typically involved 750 mL of liquor (~17 standard drinks) over a weekend, triggered by work-related stress. He reported an urge to increase tianeptine use during these episodes but denied tremors, seizures, or alcohol-related hallucinations. He noted alcohol use caused more psychosocial distress than tianeptine, particularly at work and in relationships. Cannabis was used only intermittently in small amounts (<1 g).

Buprenorphine-naloxone was initiated for both tianeptine and alcohol cravings, using a micro-induction protocol to avoid withdrawal: Day 1, 1 mg film twice daily; Day 2, 1 mg four times daily; Day 3, 2 mg four times daily; then maintenance with 4 mg four times daily while tapering tianeptine and alcohol. Supportive medications (ondansetron, trazodone, hydroxyzine, loperamide) were prescribed for withdrawal symptoms, and the patient engaged in psychotherapy through an addiction treatment program.

At follow-up, his tianeptine use had decreased, but pain-related cravings persisted. His buprenorphine-naloxone dose was increased to 8 mg twice daily, which alleviated both pain and cravings. He remains stable on this regimen, with both alcohol and opioid use disorders now in early remission and continues monthly follow-up.

DISCUSSION

Our patient had no prior history of opioid misuse before turning to over the counter "gas station" products for pain relief, which ultimately led to addiction. This case highlights growing concerns about the accessibility of tianeptine, marketed and sold with minimal regulation.[5,7,12-14] Although approved as an atypical antidepressant in some countries, tianeptine is widely misused for its opioid-like effects,[13,14] especially outside prescribed dosing (25-50 mg/day), with recreational use

reaching up to 3,000 mg/day.[6]

Its unregulated availability fosters the false perception of safety,[15] increasing risks of addiction and overdose, particularly among individuals with psychiatric or substance use disorder histories.[8,15] Misleading advertising compounds this risk. The website where our patient obtained tianeptine carried a "NOT FOR HUMAN CONSUMPTION" disclaimer yet simultaneously promoted sales through discounts, reward programs, and cryptocurrency payments.[19] Customer testimonials praising its effects further obscure potential harms. Such practices underscore the urgent need for stronger oversight.[20]

Risks are heightened by limited research on drug interactions. A Centers for Disease Control and Prevention analysis of poison control calls (2000-2017) showed 47.7% of tianeptine exposures involved co-exposures, most often with phenibut,[21] alcohol, benzodiazepines, or opioids.[10] Although poorly studied, alcohol appears to alter tianeptine absorption and may interact through overlapping effects on glutamatergic and GABAergic pathways.[1,3,22] In our case, alcohol use intensified cravings for tianeptine. Further study is needed to clarify these interactions and assess risks of concurrent use. Tianeptine should not be considered for treating depression in individuals with alcohol use disorder, given the danger of dual substance misuse.

Treatment of tianeptine addiction is another major gap. No standardized protocols exist, though buprenorphine-naloxone micro-induction has been reported in a few case studies.[15,23] Additional clinical research is needed to establish effective strategies.

In conclusion, the increasing misuse of tianeptine demands urgent medical and regulatory attention. Its widespread availability, deceptive marketing, and lack of treatment guidelines pose significant public health risks. Stronger regulation and more robust clinical research are essential to protect vulnerable populations.

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Keywords: Tianeptine, addiction psychiatry, buprenorphine, alcohol use disorder

Funding/support: Funding for the research and manuscript writing was provided by NIDA (K01DA058060, Lloyd Sieger). Research reported in this publication was supported by the National Institute on Drug Abuse of the National Institutes of Health under Award Number K01DA058060. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.
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KANSAS JOURNAL of MEDICINE

Review

Hip Internal Rotation in Healthy Baseball Athletes: A Scoping Review

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Received Mar. 17, 2025; Accepted for publication Aug. 8, 2025; Published online Oct. 15, 2025
Kans J Med 2025 Sep-Oct; 18:123-129. https://doi.org/10.17161/kjm.vol18.23740

ABSTRACT

Objective. The aim of this scoping review was to evaluate hip internal rotation (IR) range of motion (ROM) across different age groups of baseball athletes to identify those at greater risk of injury. Additional objectives included comparing hip IR ROM between dominant and non-dominant legs and between pitchers and position players.

Data Sources. PubMed, Embase, OVID, and CINAHL.

Study Selection. Inclusion criteria required studies to be full text, written in English, involve healthy baseball athletes cleared for participation, and include measurements of bilateral passive hip IR ROM prior to any interventions.

Data Extraction. Three independent reviewers systematically extracted data on population age, competition level, passive dominant hip IR ROM, and passive non-dominant hip IR ROM. When available, means, standard deviations, and sample sizes also were extracted.

Data Synthesis. The initial search yielded 155 studies, of which 23 met inclusion criteria. Aggregate data were analyzed using weighted means, pooled standard deviations, and sample sizes. Athlete groups were categorized as youth (<13 years), high school, college, and professional. College and professional groups were further stratified into pitchers and position players.

Conclusions. All groups exhibited deficits in bilateral passive hip IR ROM. Professional athletes demonstrated greater bilateral hip IR compared to college-aged athletes. The difference in mean non-dominant versus dominant hip IR between pitchers and position players was minimal, measuring less than two degrees.

INTRODUCTION

Throwing a baseball is a complex movement involving the entire kinetic chain. The energy required for the throwing motion originates in the lower body and is transferred to the upper body through the core.[1] Axial spine rotation and hip motion, particularly hip internal rotation (IR), are key components in transferring kinetic energy, especially during the arm-cocking phase of pitching.[2-4]

Normative values for hip IR range of motion (ROM) vary with age. Svenningsen et al.[5] studied 761 participants to establish baseline hip ROM values, finding the mean hip IR ROM in males to be 51° in those aged ≤8 years, 46° in 11-year-olds, 41° in 15-year-olds, and 38° in adult males with a mean age of 23.

Deficits in hip IR ROM may result in compensatory movements at other joints during throwing,[4] which can increase the risk of injury, particularly in the upper body.[6,7] Reduced hip IR has been correlated with higher injury rates in the lower body, core, and upper extremities of baseball athletes. To mitigate this risk, some clinicians have incorporated hip mobility exercises into warm-up routines and daily programs to improve hip ROM.[8]

Pitchers and position players have distinct physical demands. Pitchers perform repetitive throwing motions that may influence hip IR ROM, but this relationship remains unclear.

Also unknown is which age group or competitive level of baseball is most affected by hip IR ROM deficits. The primary aim of this scoping review was to examine hip IR ROM across different populations of baseball athletes. Secondary aims included comparing hip IR ROM between the dominant/pivot and non-dominant/stride legs, and between pitchers and position players.

METHODS

Search Strategy and Study Selection. A systematic review of the literature was performed following the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA) guidelines (Appendix 1; available online at journals.ku.edu/kjm). The review was registered with the Prospective Register of Systematic Reviews (PROSPERO; CRD42023456002), and no similar meta-analyses or systematic reviews were identified. Databases utilized included PubMed, Embase, OVID, and CINAHL. The electronic database search was performed from database inception through September 2023, the date of the literature search. Records sought were restricted to full-text manuscripts available in the English language. Key words in the search included: "hip" AND "baseball" AND ("internal rotation" OR "medial rotation"). Appendix 1 provides further specific details regarding the location of PRISMA checklist items in the manuscript.

Eligibility Criteria. Inclusion criteria consisted of peer-reviewed studies that contained full-length text, were written in the English language, utilized healthy baseball athletes of any age that were cleared for participation in organized activity, and measured and recorded bilateral passive hip IR ROM prior to any interventions. Appendix 1 provides further details regarding the inclusion and exclusion of studies in the literature search. Baseball athletes were defined as participants that were actively participating or had participated in a season of organized baseball activity. Corresponding authors of articles that did not include athlete age or specify dominant versus non-dominant data were contacted to gather that information; however, no additional information was obtained. Evaluation of articles for inclusion and exclusion criteria was conducted by a sole author.

Data Extraction. Data were extracted from each selected study by the primary author and cross-checked by each additional author to limit bias and ensure accuracy. Information sought included mean population age and standard deviation, if available, population competition level, baseball position of population, and mean passive

dominant and non-dominant hip IR ROM and standard deviations. All ROM measurements were recorded in degrees, and mean ROM measurements were utilized over individual ROM measurements when available.

Risk of Bias Assessment. An assessment of potential bias was performed by two authors on each included manuscript using the Methodological Index for Nonrandomized Studies (MINORS) criteria. The MINORS criteria is a validated instrument to assess the quality of non-randomized studies using a score between 0 and 16 for noncomparative studies, and 0 and 24 for comparative studies.[9] In the case of discrepancies in scoring, a third independent reviewer was utilized to break the tie.

Statistical Analysis. Aggregate data from each study were summarized using weighted means for athlete's age, dominant hip IR ROM, and non-dominant hip IR ROM. Weighted means were calculated using the following formula:

$$\bar{x} = \frac{\sum w_n \times x_n}{\sum w_n}$$

where w_n is the weight of each value, x_n is the individual mean value, and $\bar{x}$ is the calculated weighted mean. Weighting was based on population size per study.

To account for variation in sample size across multiple studies, pooled standard deviations were calculated using the formula:

$$SD_{pooled} = \sqrt{\frac{\sum(n_i - 1) * SD_i^2}{\sum(n_i - 1)}}$$

where n_i is the sample size and SD_i is the standard deviation of each individual study. Confidence intervals (CIs) for the weighted means were calculated using the confidence.norm function in excel, which uses the following formula with an alpha set at 0.05 for a 95% confidence interval:

$$CI = \bar{x} \pm CONFIDENCE.NORM(\alpha, SD_{pooled}, n_{total})$$

Studies were grouped into four categories based on the mean age of the participants within the study. The categories included youth (<13 years old), high school-aged (≥13 and <18 years old), college-aged (≥18 and <22 years old), and professional (≥22 years old) athletes. Data that did not have a corresponding reporting age were placed in the most accurate category per the subjective population description within each individual study. College-aged and professional populations were stratified to pitchers and position players.

When studies reported both control and comparison groups with bilateral hip IR data, each group was treated as an independent entry in the meta-analysis, resulting in 33 total groups from 23 studies.

A random-effects meta-analysis was conducted using the DerSimonian and Laird method to account for between-study variability. Heterogeneity was assessed using Cochran's Q statistic and the I^2 index. An I^2 value above 50% was considered indicative of substantial heterogeneity. Confidence intervals for tau^2 and I^2 were calculated using the Jackson method. All analyses were performed using the meta and meta for packages in R.

In addition to the meta-analysis, we calculated weighted means, pooled standard deviations, and 95% confidence intervals for dominant and non-dominant hip IR ROM stratified by age category (youth, high school, college, professional) and player position (pitcher, position player). These descriptive summaries were used to explore population-level trends. Due to limited numbers of studies per subgroup, formal meta-analyses were not conducted for these comparisons.

RESULTS

Literature Search. The initial search yielded 155 studies. After removing 66 duplicates using Microsoft Excel, 89 abstracts were screened, and 50 studies were excluded based on relevance. The full texts of the remaining 39 studies were assessed using the predetermined inclusion criteria. Of these, 23 studies met all inclusion criteria.[4,7,8,10-30] The full selection process is illustrated in Appendix 1.

Demographic Data. A total of 2,196 bilateral hip IR ROM measurements were extracted. Results are reported as weighted mean ± standard deviation (SD), with 95% confidence intervals (CI):

- Youth population: 966 bilateral measurements; mean age = 10.61 ± 1.41 years (95% CI: 10.52, 10.70),
- High school-aged population: 113 bilateral measurements; mean age = 15.93 ± 1.67 years (95% CI: 15.62, 16.24),
- College-aged population: 295 bilateral measurements; mean age = 19.54 ± 1.69 years (95% CI: 19.35, 19.73),
- Professional population: 822 bilateral measurements; mean age = 24.29 ± 3.61 years (95% CI: 23.93, 24.65).

Details of individual studies are provided in Table 1.

Within the college-aged population, there were:

- 101 bilateral measurements in the pitcher subgroup, with a mean age of 19.95 ± 1.56 years (95% CI: 19.65, 20.25),
- 85 bilateral measurements in the position player subgroup, with a mean age of 19.80 ± 1.80 years (95% CI: 19.42, 20.18),
- 109 additional bilateral measurements from athletes whose position was mixed or unspecified; these were not assigned to either subgroup.

In the professional population, there were:

- 255 bilateral measurements in the pitcher subgroup, with a mean age of 24.31 ± 4.00 years (95% CI: 23.82, 24.80),
- 130 bilateral measurements in the position player subgroup, with a mean age of 24.26 ± 2.86 years (95% CI: 23.77, 24.75).

MINORS Risk of Bias Analysis. Bias was assessed using the Methodological Index for Non-Randomized Studies (MINORS) criteria. The analysis identified:

- 15 comparative studies[4,7,8,10-15,18,19,22,24-26] with a mean score of 16.33 ± 1.86 (out of 24 points),
- 8 non-comparative studies[16,17,20,21,23,27-29] with a mean score of 8.75 ± 1.03 (out of 16 points).

Full details of the bias assessment are available in Appendix 2 (accessible online at journals.ku.edu/kjm).

Table 1a. Demographic and statistical data of included studies.

Authors	Control Group Competition Level	Comparison Group Competition Level	Control Group Condition	Comparison Group Condition	Control Group N	Comparison Group N	Group(s) Utilized within this Systematic Review
Camp[11]	Professional	Professional	PP	Pitchers	42	54	Both
Camp[12]	Professional	Professional	PP	Pitchers	129	129	Both
Chan[13]	Professional	Professional	PP	Pitchers	136	186	Both
Cheng[14]	HS	HS	Healthy	GIRD	13	12	Both
Garrison[15]	HS + Collegiate (Collegiate)	HS + Collegiate (Collegiate)	Healthy	Previous UCL Tear	87	87	Control Group
Hamano[16]	Youth	Youth	Healthy	Injured	211	52	Both
Harding[17]	Youth	NA	Healthy	NA	28	NA	Control Group
Ishigaki[18]	College	NA	Healthy (Pitchers and PP)	NA	22	NA	Control Group
Kim[19]	Youth + HS (Youth)	Youth	Healthy	Shoulder Pain	35	60	Control Group
Laudner[8]	Professional	Professional	PP	Pitchers	40	40	Both
McCulloch[20]	Professional	NA	Pitchers	NA	111	NA	Control Group
Oliver[21]	Youth	NA	Healthy	NA	26	NA	Control Group
Oliver[22]	Youth	Youth	Pregame	Postgame	19	19	Control Group
Picha[23]	Youth + HS (Youth)	NA	Healthy	NA	72	NA	Control Group
Plummer[24]	HS	NA	Healthy	NA	25	NA	Control Group
Robb[4]	Professional	NA	Pitchers	NA	19	NA	Control Group
Saito[25]	Youth	Youth	Healthy	Elbow Pain	89	33	Control Group
Sakata[9]	Youth	Youth	Healthy	Injured Medial Elbow	242	78	Control Group
Sauers[26]	Professional	Professional	PP	Pitchers	49	50	Both
Sekiguchi[27]	Youth	Youth	Healthy	Pain	161	16	Control Group
Takeuchi[28]	College	College	PP	Pitchers	85	64	Both
Yanagisawa[29]	College	NA	Pitchers	NA	23	NA	Control Group
Zeppieri[30]	College	College	Pitchers (preseason)	Pitchers (postseason)	14	14	Control Group

* HS = high school; PP = position players; GIRD = glenohumeral internal rotation deficit; UCL = ulnar collateral ligament. NA denotes the study did not include a comparison group. Groups with more than one population have the most common denoted in parentheses.

Table 1b. Demographic and statistical data of included studies, continued.

Authors	Mean Control Group Age (SD)	Mean Comparison Group Age (SD)	Mean Control Dominant Hip IR ROM (SD)	Mean Comparison Dominant Hip IR ROM (SD)	Mean Control Nondominant Hip IR ROM (SD)	Mean Comparison Nondominant Hip IR ROM (SD)
Camp[11]	27.3 (3.6)	27.9 (4.7)	34 (10.8)	37.1 (9.7)	34.1 (11.3)	39.1 (9.0)
Camp[12]	NA	NA	40.6 (8.6)	40.8 (8.4)	40.1 (8.7)	40.9 (7.4)
Chan[13]	NA	NA	35.2 (10.2)	36.5 (9.3)	35.3 (11.0)	37.1 (9.0)
Cheng[14]	17.08 (1.23)	16.64 (0.95)	35.62 (7.86)	29.79 (6.770	32.31 (7.20)	29.75 (7.28)
Garrison[15]	18.6 (1.9)	17.7 (2.0)	29.6 (9.5)	30.6 (10.5)	29.5 (9.0)	33.5 (17.5)
Hamano[16]	10.5 (1.5)	11.4 (1.3)	56.8 (10.8)	52.5 (11.3)	55.7 (10.6)	52.3 (13.0)
Harding[17]	13.9 (2.9)	NA	30.2 (6.6)	NA	33.1 (8.9)	NA
Ishigaki[18]	20.4 (1.0)	NA	35.1 (8.4)	NA	34 (9.2)	NA
Kim[19]	16.9 (1.5)	16.7 (0.9)	24.5 (7.8)	24.4 (6.4)	26 (7.4)	27.4 (7.4)
Laudner[8]	23.9 (2.1)	23.5 (2.9)	37.7 (5.8)	34.6 (4.4)	37 (4.8)	34.4 (6.1)
McCulloch[20]	23.9 (4.6)	NA	32.6 (8.7)	NA	31.9 (7.0)	NA
Oliver[21]	11.3 (1.0)	NA	31.3 (8.3)	NA	28.5 (6.1)	NA
Oliver[22]	11.3 (0.6)	11.3 (0.6)	34.9 (8.7)	33.4 (8.6)	28.9 (6.4)	29.7 (7.5)
Picha[23]	12.8 (3.3)	NA	32.8 (7.7)	NA	34.8 (8.8)	NA
Plummer[24]	15.9 (1.1)	NA	25.1 (8.2)	NA	24.2 (6.8)	NA
Robb[4]	NA	NA	50.8 (9.2)	NA	31.3 (6.2)	NA
Saito[25]	11.9 (2.0)	12.5 (1.4)	46.9 (13.3)	36.1 (15.7)	46.9 (12.2)	36.4 (18.1)
Sakata[9]	9.2 (1.3)	10 (1.0)	40.1 (23.8)	36.4 (13.7)	38.2 (12.2)	34.8 (13.3)
Sauers[26]	22 (2.8)	22 (2.8)	36.9 (4.9)	37.2 (5.7)	38.4 (4.7)	37 (5.6)
Sekiguchi[27]	11 (0.8)	11.1 (0.5)	48 (13)	46 (11)	44 (13)	36 (8)
Takeuchi[28]	19.8 (1.8)	20.3 (1.8)	25.4 (6.7)	28.3 (8.2)	28.9 (8.0)	29 (6.9)
Yanagisawa[29]	19.3 (1.0)	NA	45.7 (5.8)	NA	41.8 (7.2)	NA
Zeppieri[30]	19.4 (1.4)	19.4 (1.4)	15.1 (4.6)	14.7 (5.1)	17.1 (7.2)	15.1 (4.2)

* IR = internal rotation; ROM = range of motion; SD = standard deviation. NA denotes that the data was not included within the original manuscript.

Table 2. Weighted means analysis of internal rotation for four populations.

Population	n (Age Available)	Weighted Mean Age in Years (SD) [CI]	Normative Hip IR ROM per Svenningsen et al.[5] in Degrees	Weighted Mean Nondominant Hip IR in Degrees (SD) [CI]	Weighted Mean Dominant Hip IR in Degrees (SD) [CI]
Youth	966 (966)	10.61 (1.41) [10.52-10.70]	46[a]	43.54 (11.51) [42.81-44.27]	45.27 (14.58) [44.35-46.19]
HS-Aged	113 (113)	15.93 (1.67) [15.62-16.24]	41[b]	28.49 (7.60) [27.09-29.89]	27.89 (7.49) [26.51-29.27]
College-Aged	295 (295)	19.54 (1.69) [19.35-19.73]	38[c]	29.92 (8.05) [29.00-30.84]	29.09 (7.81) [28.20-29.98]
Professional	822 (385)	24.29 (3.61) [23.93-24.65]	38[c]	37.06 (7.88) [36.52-37.60]	37.44 (8.27) [36.87-38.01]

* SD = standard deviation; CI = confidence interval.
[a] Normative value calculated in 11-year-old males[5]
[b] Normative value calculated in 15-year-old males[5]
[c] Normative value calculated in 23-year-old males[5]

Table 3. Weighted means analysis of internal rotation stratified to pitchers and position players.

Population	Position	n (Age Available)	Weighted Mean Age in Years (SD) [CI]	Weighted Mean Nondominant Hip IR ROM in Degrees (SD) [CI]	Weighted Mean Dominant Hip IR ROM in Degrees (SD) [CI]
College-Aged	Pitcher	101 (101)	19.95 (1.56) [19.65-20.25]	30.27 (7.01) [28.90-31.64]	30.43 (7.15) [29.04-31.82]
College-Aged	Position Player	85 (85)	19.80 (1.80) [19.42-20.18]	28.90 (8.00) [27.20-30.60]	25.40 (6.70) [23.98-26.82]
Professional	Pitcher	479 (255)	24.31 (4.00) [23.82-24.80]	36.68 (7.40) [36.02-37.34]	37.30 (8.17) [36.57-38.03]
Professional	Position Player	343 (130)	24.26 (2.84) [23.77-24.75]	37.60 (8.55) [36.70-38.50]	37.53 (8.40) [36.64-38.42]

* SD = standard deviation; CI = confidence interval.

Statistical Analysis of Included Studies. Weighted mean analyses for dominant and non-dominant hip IR ROM across subgroups are summarized in Tables 2 and 3.

Key findings:

- Across all populations except for college-aged position players, the difference between dominant and non-dominant hip IR was less than two degrees.
- Similarly, the difference in mean hip IR between pitchers and position players also was less than two degrees.
- A notable decrease in bilateral hip IR ROM was observed between the youth and high school-aged groups.

Meta Analysis. A total of 23 studies were included in the systematic review, comprising 33 independent groups (including control and comparison arms) that reported bilateral hip IR data. The pooled mean difference in hip IR between the dominant and non-dominant legs was 0.84° (95% CI: -0.17° to 1.86°; p = 0.103), indicating no statistically significant difference.

Heterogeneity among studies was substantial:

- Cochran's Q = 109.88, df = 32, p <0.0001
- I^2 = 70.9% (95% CI: 58.6% to 79.5%)
- Tau^2 = 5.68 (95% CI: 4.91 to 18.66)

These values support the use of a random-effects model and indicate considerable variability in effect sizes across studies. Figure 1 presents a forest plot to visualize individual study effect sizes and their corresponding confidence intervals.

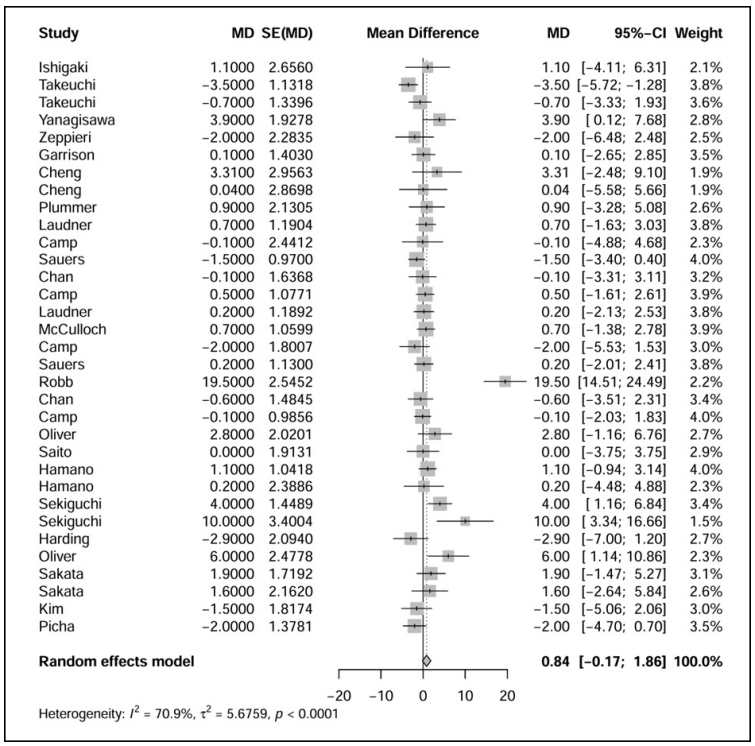

Figure 1. Forest Plot of effect sizes and confidence intervals for included study groups.

DISCUSSION

The scoping review revealed no statistically significant difference in hip IR between dominant and non-dominant legs across studies. However, the high heterogeneity (I^2 = 70.9%) suggests substantial variability among the included studies in terms of population characteristics, measurement techniques, or methodological quality. This variability may obscure small but clinically meaningful differences. The wide confidence intervals for Tau^2 and I^2 further emphasize the uncertainty in estimating between-study variance. Thus, the use of a random-effects model is justified, and the findings underscore the need for more standardized protocols in future research on hip IR in baseball athletes.

Based on the normative hip ROM values reported by Svenningsen et al.,[5] all athlete subgroups exhibited a deficit in bilateral hip IR ROM. This deficit was less than 3 degrees in youth athletes and less than 1 degree in professionals. However, the reductions were more pronounced in high school-aged and college-aged athletes. High school-aged athletes showed a difference in bilateral hip IR of over 12 degrees, while college-aged athletes had a difference of over 8 degrees. Existing literature suggests that reduced hip ROM increases the risk of injury across the kinetic chain,[6,7,30,31] and these findings may indicate that a substantial proportion of baseball athletes, though asymptomatic, are at elevated risk.

A measurable decline in bilateral hip IR ROM occurred between youth and high school-aged groups. This is likely due to physiologic changes during puberty, although the extent of such changes has not been clearly defined.[5] Other contributing factors may include increased sport specialization and longer seasons.[12,32] Interestingly, little difference was seen between high school- and college-aged athletes, yet a notable increase in hip IR ROM was observed from college-aged to professional athletes, counter to expectations, as ROM typically decreases with age.[5]

One potential explanation is that greater hip IR ROM provides a competitive advantage. Limited IR ROM can lead to compensatory kinematic movements, altered biomechanics, and reduced energy transfer from lower to upper body, potentially lowering pitch velocity.[4] A study involving 29 high school and college-aged athletes (mean age 18.1 ± 2.5 years) found increased bilateral hip IR ROM in both pitchers and position players, suggesting performance benefits for batting and fielding as well.[33]

Another explanation is that professional athletes benefit from structured interventions to increase hip ROM. These programs often include advanced training equipment and access to certified athletic trainers who can implement targeted stretching and strengthening routines. A key muscle targeted is the gluteus medius, which functions as both a pelvic stabilizer and internal rotator. Weakness in this muscle can reduce hip IR ROM, disrupt the kinetic chain, and increase injury risk.[34]

Within college-aged athletes, pitchers showed slightly higher dominant leg hip IR ROM than position players. This difference is likely multifactorial, potentially reflecting variations in warm-up routines, positional demands, or arm care strategies.

Athletic trainers play a critical role in developing effective injury prevention programs. They are uniquely trained to implement structured routines, coach proper form, and tailor interventions for physically

active populations. Studies show that trainer-led programs are more effective and cost-efficient than those led by coaches or self-directed by athletes.[35,36] Unfortunately, many high schools and small colleges, especially in rural areas, lack sufficient athletic training staff, citing inadequate funding as a major barrier.[37] As a result, injury prevention programs may be challenging to implement effectively in these settings.

There is limited research on youth-specific programs to increase hip IR ROM. One exception is a non-randomized controlled trial by Sakata et al.,[8] which evaluated a program consisting of nine strengthening and nine stretching exercises performed daily. After one year, the intervention group demonstrated significantly higher dominant-side hip IR ROM than the control group.

Regarding the MINORS analysis, comparative studies scored higher on average than non-comparative ones. However, the comparisons within original studies did not always match those in this review. As a result, the MINORS tool may have underrepresented the true risk of bias in comparative studies, due to a mismatch between the tool's design and the actual data use in this review.

Limitations. This study has several limitations. First, the lack of individual-level data restricted our ability to analyze how career duration, multisport participation, or age-specific trends influence hip IR ROM. Efforts to obtain individualized datasets from study authors were unsuccessful. Some studies included athletes from multiple subgroups (e.g., both high school and college), but due to limited reporting, we were forced to categorize them based on the best available information.[15,19,23]

Another limitation was the lack of standardization in hip IR ROM measurement techniques. Studies used different patient positions (e.g., prone or seated) and a variety of tools (universal goniometers, bubble goniometers, digital inclinometers), introducing measurement error. To our knowledge, no published studies have validated the accuracy or reliability of these devices specifically for hip ROM.

Despite grouping athletes into four age-based categories, numerous unexplored subcategories remain, such as variations by school size, resource availability, and professional level (e.g., minor vs. major league). Additionally, all studies were conducted in the United States or Japan, limiting generalizability to athletes from other countries or cultural contexts.

CONCLUSIONS

While the pooled estimate showed no significant difference in hip IR between dominant and non-dominant legs, substantial heterogeneity limits the generalizability of this finding. Future studies should aim to reduce methodological variability and explore moderators of hip IR asymmetry.

Across all age groups, deficits in bilateral hip IR ROM were evident, with high school and college-aged athletes showing the largest deficits. These populations may benefit most from targeted IR interventions. The notable decline between youth and high school athletes may be due to puberty, longer competitive seasons, increased physical demands, and sport specialization.

Conversely, the increase in hip IR among professional athletes, despite their longer seasons and greater physical demands, may reflect successful intervention programs at the professional level. Future research should identify what degree of IR ROM deficit constitutes a significant injury risk and evaluate how professional-level interventions can be adapted for resource-limited settings like high schools and small colleges.

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Keywords: hip, range of motion, baseball, primary prevention

Presentations: This work was previously presented at The University of Kansas Medical Center Student Research Forum in Kansas City, Kansas on April 3, 2024.

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KANSAS JOURNAL of MEDICINE

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VOLUME 18 • 2025

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Kansas Journal of Medicine is partially supported by Wichita Medical Research & Education Foundation.
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