Study Characteristics:
- Studies were published between 2015-2020, mostly reporting on data collected from 2013-2017.
- 24 studies represented 16 unique cohorts.
- 17 were based in the US, 4 in South Korea, 2 in the UK and 1 in Taiwan.
- 12 articles analyzed nationally representative samples, one was a clinical population, the rest were school-based.
- Most studies focused on vaping nicotine, while 2 studies focused on viping cannabis or other illicit substances.
- 15 were cross-sectional analyses, while 9 were longitudinal.

Depression:
- 6 of 7 studies found positive associations between EC use and depressive symptoms. Most of these were cross-sectional national surveys with limited measures of depression.
- One longitudinal California study suggested a bidirectional relationship between EC use and depression: Sustained EC use was associated with escalation of depressive symptoms over time and past-month-use frequency was positively associated with depressive symptoms among sustained users (3).

Anxiety:
- One study assessed anxiety among adolescents using EC (4).
- Lifetime EC-only users had higher levels of panic disorder than lifetime nicotine abstinence.
- EC-only use was less strongly related with anxiety than CC-only use.

Suicidality:
- Four cross-sectional national studies in the US and Korea found current EC use associated with suicidality.
- Analysis of US Youth Risk Behavior Survey (2015-2017) showed current EC use only associated with past year suicidal ideation (6).
- Korean Youth Risk Behavior Surveys (2015, 2016, and 2017) found significant associations between current EC use and past year suicidal ideation, plans, attempts, and serious attempts.

Eating Disorders:
- One South Korean national cross-sectional study (6) found that female lifetime and current EC users had significantly higher rates of all unhealthy weight control behaviors, while male current (but not former) EC users had higher rates.

Conduct Disorder and Delinquency:
- Three longitudinal studies examined and found relationships between conduct disorder and EC use.
- In a US national survey, baseline rule-breaking tendency independently predicted EC use in the subsequent year (7).
- In a school-based cohort, past 6-month delinquent behavior was associated with later EC use, and CC use among a cohort of nicotine-naive US high school students.
- Reports of various delinquent behaviors were significantly higher for lifetime EC only users versus never users.

ADHD:
- Two longitudinal studies examined relationships between ADHD symptoms and EC use among US high school students over 12-18 months (6, 8).
- Both found that ADHD symptoms predicted subsequent EC use but not CC use. EC use frequency did not associate with subsequent ADHD symptoms.

Impulsivity and Executive Function (EF):
- Five studies found relationships between impulsivity and/or EF and EC use, as well as earlier initiation and higher frequency use.
- In longitudinal study of British high school students, baseline impulsivity predicted onset of EC use and CC use at 24-months (10).

Perceived Stress:
- One study assessed perceived stress in adolescents and found that in a four-year longitudinal follow-up of California teenagers, baseline (age 13) perceived stress was associated with lifetime and past-month EC use and CC use (11).

SUMMARY AND DISCUSSION:

- 24 studies assessed mental health comorbidities of EC use among adolescents.
- EC use was associated with depression, suicidality, disorders eating, ADHD, conduct disorder, impulsivity, and perceived stress, with additional limited evidence for anxiety.
- These findings largely align with prior findings regarding CC use.
- Anxiety, externalizing symptoms, and conduct problems were more strongly associated with adolescent CC use than EC use.

REFERENCES: