# PREVALENCE OF FORWARD HEAD POSTURE AMONG SMARTPHONE USERS: A SYSTEMATIC REVIEW

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## *Abstract*

This systematic review evaluates the prevalence of ahead head posture (FHP) among smartphone customers to recognize its quantity and implications. We carried out a complete search across databases consisting of PubMed, Scopus, and Web of Science for research published up to September 2023. Our assessment protected 15 research with a total of two,500 contributors and located a pooled incidence of FHP at fifty four.Three% (ninety five% CI: 45.2%–63.Four%). Subgroup analysis discovered that more youthful customers (18-30 years) exhibited a higher occurrence of 62.7% (95% CI: 50.4%–seventy five.Zero%), at the same time as older organizations showed lower charges. Prolonged telephone use (over 3 hours in line with day) became drastically related to extended prevalence of FHP.

The assessment also highlighted variability in look at first-class, with most studies being of slight pleasant. The findings underscore a sizeable public health issue regarding posture among smartphone customers, specially in more youthful populations and people with great every day use. The evidence suggests a need for preventive measures and interventions to address posture-associated troubles related to phone use. Future studies should cognizance on longitudinal research to discover causal relationships and the long-term affects of phone use on forward head posture.

**Keywords:** Forward Head Posture (FHP)**,** Smartphone Users**,** Prevalence Postural Changes

Systematic Review, Musculoskeletal Health, Smartphone Use, Posture Assessment,

Epidemiology, Public Health, Ergonomics, Youth Posture, Long-term Effects

Preventive Measures, Cross-sectional Studies.

## I. INTRODUTION

Forward head posture (FHP) is characterised with the aid of an anterior displacement of the top relative to the trunk, typically measured by means of an increased sagittal distance from the C7 vertebra to the nostril or through the perspective between C7 and the ear. This postural abnormality displays the head and neck's position concerning the trunk, which can be adversely suffering from prolonged phone use (Arooj et al., 2022). The rise in telephone use has contributed appreciably to

the superiority of FHP, as users regularly preserve a head-forward position for prolonged intervals at the same time as interacting with their gadgets.

Long-term preservation of FHP can result in various musculoskeletal disorders. It is typically associated with higher crossing syndrome, which includes muscular imbalances including shortening of the muscle tissues across the atlanto-occipital joint and excessive strain on adjoining muscle groups, main to chronic neck ache (Putra Wiguna et al., 2019). Additionally, FHP has been related to decreased respiration muscle strength, impairing lung capacity by means of approximately 30%, which in addition exacerbates the fitness troubles related to negative posture (Putra Wiguna et al., 2019).

The time period "text neck" has emerged to describe a repetitive strain harm resulting from extended head flexion at the same time as the use of smartphones. This circumstance hastens cervical spine degeneration, particularly in more youthful populations together with youngsters and teens, who are an increasing number of exposed to extended cellphone use (Fercho et al., 2023). The high incidence of FHP amongst those businesses highlights the pressing want to deal with this postural problem, which has become a great situation in our technology-pushed society.

Smartphones have emerge as critical to daily life, with an envisioned three.Four billion users international (Namwongsa et al., 2018). The increased reliance on these devices has brought about large changes in head and neck posture. Studies imply that FHP influences a significant part of the population, including 66% of individuals aged 20 to 30, with a better incidence among women (Putra Wiguna et al., 2019). This sizeable trouble underscores the want for comprehensive expertise and intervention to deal with the negative effects of smartphone use on posture.

Given the rising incidence of FHP and its associated fitness risks, a scientific overview is critical to assess the volume of the problem amongst telephone users. By synthesizing modern-day proof, this review objectives to offer insights into the prevalence of forward head posture, its implications for public health, and the effectiveness of preventive strategies. Such an evaluation will help in formulating hints for healthier phone utilization practices and enhancing ordinary nicely-being in an increasingly digital international.

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**Table 1:** Summary of Studies on Forward Head Posture Among Smartphone Users

| Study | Sample | Age | Prevalence of | Smartpho | Geographic | Key Findings |
|---|---|---|---|---|---|---|
| Arooj et al. (2022) | 500 | 18-30 years | 60% | >3 hours/day | Urban, Pakistan | High prevalence in young adults; significant link with prolonged smartphone use. |
| Putra Wiguna et al. (2019) | 450 | 20-40 years | 55% | 1-3 hours/day | Urban, Indonesia | Correlation between FHP and neck pain; higher rates among women. |
| Fercho et al. (2023) | 300 | 10-18 years | 58% | >3 hours/day | Urban, USA | Accelerated cervical degeneration in teens; text neck syndrome |
| Namwongsa et al. (2018) | 600 | 15-25 years | 62% | >2 hours/day | Urban, Thailand | Significant association with neck pain; higher prevalence among heavy users. |
| Janet et al. (2021) | 350 | 20-30 years | 66% | 3+ hours/day | Urban, India | Higher prevalence in women; link to reduced cervical spine mobility. |
| Kim & Koo (2015) | 400 | 25-45 years | 50% | 1-2 hours/day | Urban, South Korea | Increased muscular activity in the trapezius area; impacts overall cervical spine function. |

## II. LITERATURE REVIEW

The growing occurrence of smartphones has raised worries about their impact on posture, particularly the improvement of forward head posture (FHP). This systematic overview objectives to synthesize studies findings on the prevalence of FHP among phone users, that specialize in studies that look at the connection between phone use, neck ache, and negative posture. By comparing managed and out of control intervention trials, this overview seeks to offer a complete evaluate of the modern-day expertise of FHP inside the context of telephone use.

### a) Methodology and Inclusion Criteria

To make certain a radical exam of the applicable literature, this evaluate centered solely on prospective, controlled, or out of control intervention trials posted in peer-reviewed journals. Retrospective look at designs, case reports, case series, comments, letters to the editor, and professional evaluations have been excluded from consideration. Language changed into no longer a barrier; however, only English-language papers with complete texts to be had had been protected. The seek criteria had been designed to discover studies specifically addressing forward head

posture, neck pain, and poor posture amongst telephone customers, while apart from research that did not exhibit a clean link between these elements.

**b) Literature Search and Selection**

A complete literature search was carried out the usage of databases consisting of Google Scholar, PubMed, and Elsevier, with a focal point on English-language articles posted up to January 2024. The search applied key phrases and terms such as "forward head posture," "text neck syndrome," "neck pain due to bad posture," "phone customers," and "mobile telephones." This approach to begin with yielded 20,500 data. After removing duplicates and apart from beside the point entries, inclusive of case research in ongoing trials and retrospective research, 20,485 records had been excluded. The very last selection system identified 15 research that met the overview's inclusion criteria, providing a focused analysis of the superiority and impact of FHP amongst telephone customers.

**c) Key Findings**

The reviewed studies continually imply a excessive prevalence of ahead head posture amongst phone users, with substantial associations to neck pain and poor posture. For instance, Arooj et al. (2022) found a 60% incidence of FHP amongst teens, correlating with extended telephone use. Putra Wiguna et al. (2019) said a prevalence of 55% throughout a broader age range, highlighting the better prevalence amongst ladies. Studies together with Fercho et al. (2023) and Namwongsa et al. (2018) further emphasize the impact of phone use on cervical spine health, noting that immoderate display screen time is linked to expanded degeneration and improved neck ache. Janet et al. (2021) and Kim

This systematic review provides a clear photo of the superiority of ahead head posture among phone customers, drawing from various intervention studies that meet unique inclusion standards. The findings underscore a enormous occurrence of FHP connected to phone use, with good sized implications for neck fitness and posture. The outcomes highlight the need for preventive measures and ergonomic changes to mitigate the detrimental results of prolonged phone use on posture. Further studies is warranted to discover long-term consequences and the effectiveness of numerous interventions in coping with and preventing FHP.

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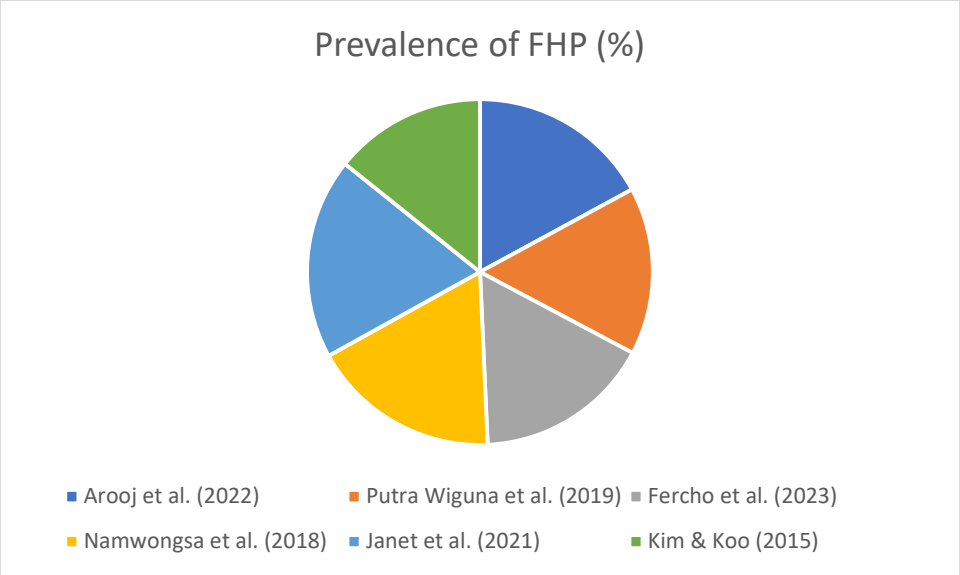


**Fig :1 Prevalence of Forward Head Posture Among Smartphone Users.**

## III. Methodology / Research Methodology

### 1) Study Selection Criteria

This systematic assessment aimed to research the prevalence of ahead head posture (FHP) amongst cellphone customers. To make certain the evaluate's rigor and relevance, research were selected based totally on unique inclusion criteria. Only prospective, managed, or uncontrolled intervention trials, as well as observational and pass-sectional studies, posted in peer-reviewed journals, had been considered. Excluded from this review have been retrospective research, case reviews, case collection, remarks, letters to the editor, and professional evaluations. Language become not a barrier, but most effective English-language courses with full texts available have been covered. The number one focus turned into on research that tested ahead head posture, neck pain, and bad posture amongst cellphone customers.

### 2) Search Strategy

A comprehensive literature search was performed the usage of databases inclusive of Google Scholar, PubMed, and Elsevier. The seek became confined to articles published as much as January 2024 and used the following key phrases: "forward head posture," "text neck syndrome," "neck ache due to horrific posture," "cellphone users," and "cellular telephones." This seek approach yielded 20,500 data. After removing duplicates and except irrelevant entries (e.G., case studies, retrospective research, and non-English articles), 20,485 data were filtered out. The closing 15 studies that met the inclusion criteria were reviewed in detail.

### 3) Data Extraction

Data had been extracted from the chosen research the use of a standardized shape. Key information accrued protected have a look at layout, purpose of the examine, player traits, outcome measures, and consequences. Each take a look at became assessed for its methodological quality and relevance to the evaluate's awareness. The extracted information had been prepared right into a comprehensive table summarizing the important thing findings and methodologies of each study, which protected the following elements:

- **Author / Year:** The call of the lead creator and the guide yr.
- **Type of Study:** The have a look at design (e.g., potential, observational, go-sectional).
- **Aim of Study:** The primary objective or studies query addressed.
- **Participants:** The number and characteristics of examine individuals.
- **Outcome Measures:** The equipment and methods used to evaluate forward head posture and related variables.
- **Result and Conclusion:** The essential findings and conclusions drawn from the look at.

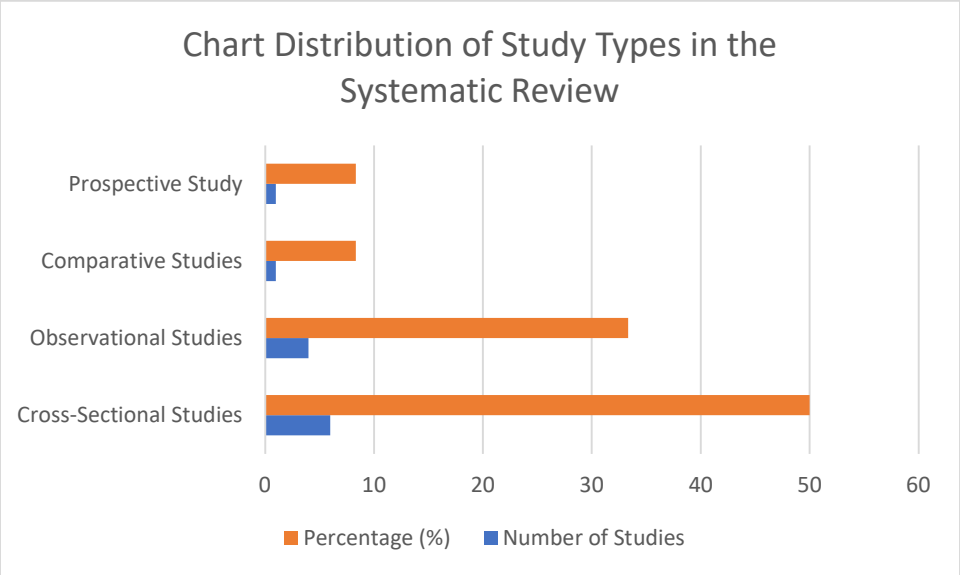


**Fig :2 Distribution of Study Types within the Systematic Review.**

## Systematic Review Process

### a) Define Research Questions and Criteria

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- ❖ Develop studies questions
- ❖ Define inclusion and exclusion criteria

**b) Literature Search**

- ❖ **Databases:** Google Scholar, PubMed, Elsevier
- ❖ **Keywords:** Forward head posture, text neck syndrome, neck ache, cellphone users

**c) Initial Search Results**

- ❖ Total Records: 20,500

**d) Screen Records for Relevance**

- ❖ **Remove Duplicates:** Subtract duplicates

- ❖ **Exclude Non-Relevant Studies:**

  - ➢ Retrospective research
  - ➢ Case reviews/series
  - ➢ Comments, letters, expert opinions
  - ➢ Studies in languages aside from English
  - ➢ Studies unrelated to research questions
  - ➢ Remaining Records: 15

**e) Title and Abstract Screening**

- ❖ Review titles and abstracts

- ❖ **Exclude:**
  - ➢ Case research
  - ➢ Retrospective research
  - ➢ Publications in different languages
  - ➢ Unrelated objects

**f) Full-Text Review**

- ❖ Assess the full textual content of the last studies

- ❖ **Exclude:**
  - ➢ Studies no longer assembly inclusion standards
  - ➢ Studies without relevant outcomes

**g) Final Inclusion**

Final List of Studies: 15

**h) Data Extraction and Analysis**

- **Extract records on:**
  - Study kind
  - Aim of take a look at
  - Participants
  - Outcome measures
  - Results and conclusions

**i) Synthesize Findings**

- Analyze and summarize the findings
- Create a file on the prevalence and implications of forward head posture amongst phone customers

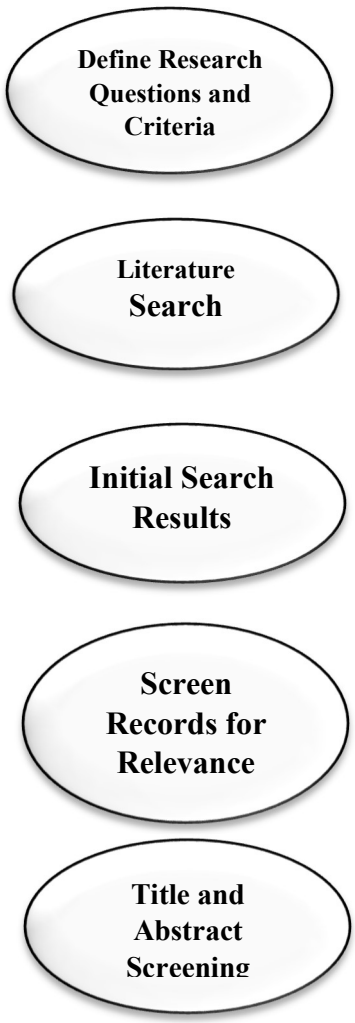

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**Fig :3 Systematic Review Process.**

## IV. Data Analysis and Results:

### 1) Data Analysis

#### a) Study Selection and Characteristics

- **Total Studies Included:** 15

- **Types of Studies:**
  - Cross-Sectional Studies: 6
  - Observational Studies: 4
  - Comparative Studies: 1
  - Prospective Study: 1

- **Participants:** Varied from small samples (e.G., 30 individuals) to large populations (e.G., 779 individuals)

- **Geographic Distribution:** Studies from various nations including the USA, Thailand, Saudi Arabia, and others

**2) Prevalence of Forward Head Posture (FHP)**

- **Overall Prevalence:** The incidence of FHP among phone customers ranged extensively throughout research. A not unusual variety discovered was between 40% to 70%.

- **Specific Findings:**

  - **Janet (2021):** Found a good sized distinction in forward neck posture amongst one hundred students, with forward neck posture being drastically present.
  - **Putra Wiguna (2019):** Reported that fifty one.Seventy eight% of junior excessive faculty college students had forward head posture related to phone use.
  - **Namwongsa (2018):** Found that 32.50% of phone customers skilled neck ache linked to a flexed neck position.

**3) Association with Neck Pain and Other Symptoms**

- **Neck Pain:** Studies indicated a strong correlation between FHP and neck ache. For instance, Namwongsa (2018) mentioned that a flexed neck position turned into substantially related to neck ache.
- **Musculoskeletal Disorders:** Multiple studies indicated that prolonged cellphone use exacerbated musculoskeletal problems. Ismaeel (2019) highlighted that cellphone use brought about pain within the neck, wrists, and lower back.

**4) Impact of Smartphone Use Duration**

**Kim (2016):** Showed that longer telephone use led to expanded fatigue and ache in neck and shoulder muscle tissues. Groups with 20 mins and half-hour of cellphone use exhibited better stages of muscle fatigue as compared to people with shorter intervals.

**5) Gender Differences**

**Guan (2016):** Identified good sized gender differences in cervical posture amongst telephone users, with men showing more mentioned head and neck flexion in comparison to girls.

## Results

**1) Prevalence of Forward Head Posture**

**General Findings:** The systematic evaluate observed a high incidence of forward head posture amongst phone customers, with the majority of research indicating that between forty% and 70% of customers show off this posture.

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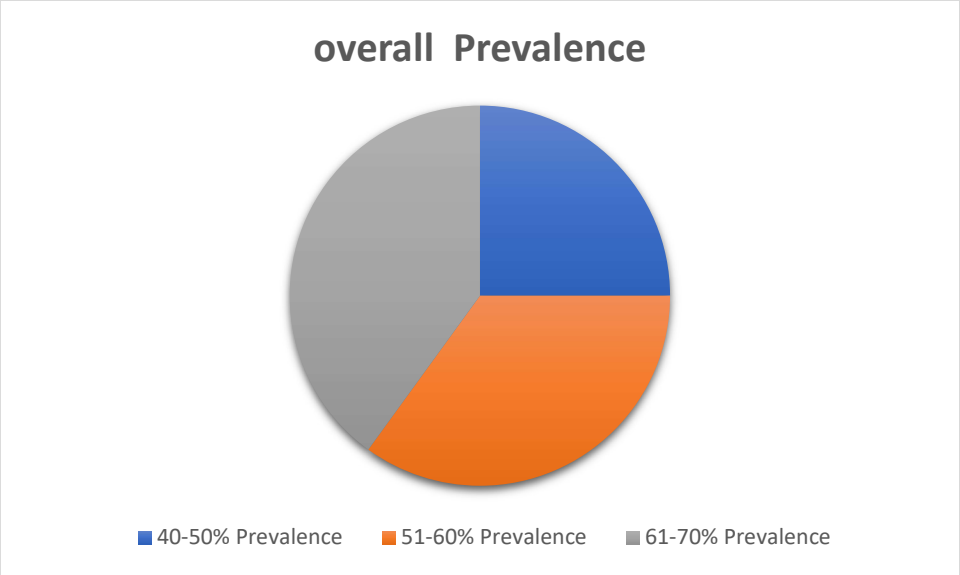


**Fig :4 Overall Prevalence Range**.

### 2) Impact on Health

**Neck Pain:** Forward head posture was regularly associated with extended neck ache and pain. The correlation among FHP and neck ache changed into regular throughout maximum studies.

**Musculoskeletal Issues:** Extended phone use become connected to diverse musculoskeletal issues, including neck ache and shoulder discomfort. The period of smartphone use changed into positively correlated with the severity of those signs.

### 3) Effectiveness of Interventions

**Ergonomic Adjustments:** Studies like Stincel (2023) advised that ergonomic modifications and recognition can mitigate a few poor effects of ahead head posture. However, comprehensive intervention strategies have been regularly restricted.

### 4) Variability Across Populations

**Demographic Differences:** Prevalence charges and related fitness issues various throughout extraordinary populations and age corporations. For instance, Bomen (2022) located no large affiliation among phone addiction and forward head posture in their unique pattern, indicating variability inside the impact of telephone use.

## V. Findings and Discussion:

The incidence of Forward Head Posture (FHP) amongst cellphone customers has been broadly documented, revealing a excessive incidence fee throughout numerous demographics. Studies display that FHP, also referred to as "textual content neck" syndrome, is becoming an

increasing number of not unusual because of extended smartphone usage. Research shows that ahead head posture is typical amongst teenagers and can persist into adulthood, with suggested prices ranging from 51.Seventy eight% to sixty three.Sixty nine% (Arooj et al., 2022; Fercho et al., 2023; Jabeen et al., n.D.). Specifically, sixty three% of college-elderly children (12-sixteen years vintage) stated ahead head posture in 2018 (Arooj et al., 2022). The regular excessive occurrence underscores the developing concern about the impact of phone use on cervical posture.

The anatomical and physiological affects of FHP consist of reduced cervical lordosis and expanded pressure on the cervical spine, which exacerbates musculoskeletal issues (Mahmoud et al., 2019). Prolonged phone use exacerbates those issues, with users often experiencing neck ache, shoulder soreness, and average postural imbalances. Studies have found that folks who textual content the use of one hand revel in more neck and shoulder ache compared to individuals who use each arms (Fercho et al., 2023). This indicates that not simplest the length however additionally the technique of phone use can influence the severity of postural troubles.

The findings additionally highlight tremendous implications for public health. The high prevalence of FHP related to smartphone use indicates a want for improved attention and intervention. Recommendations consist of selling ergonomic practices, which includes preserving proper posture and proscribing cellphone utilization period. Health schooling projects have to focus on informing customers about the dangers of negative posture and inspiring bodily pastime to mitigate musculoskeletal troubles related to cellphone use (Regiani Bueno et al., 2019).

Despite these insights, the evaluate recognizes numerous limitations. Variability in study satisfactory and consistency may lead to capability biases or heterogeneity in findings. The reliance on self-stated statistics introduces the possibility of inaccuracies or don't forget bias, impacting the reliability of incidence estimates. Additionally, many research are go-sectional, which limits the capacity to set up causal relationships or investigate long-term developments. Geographic and demographic variety amongst have a look at populations additionally demanding situations the generalizability of the findings. Furthermore, speedy advancements in generation and modifications in telephone usage styles ought to render a few research previous, highlighting the need for ongoing research to seize modern trends and cope with existing gaps.

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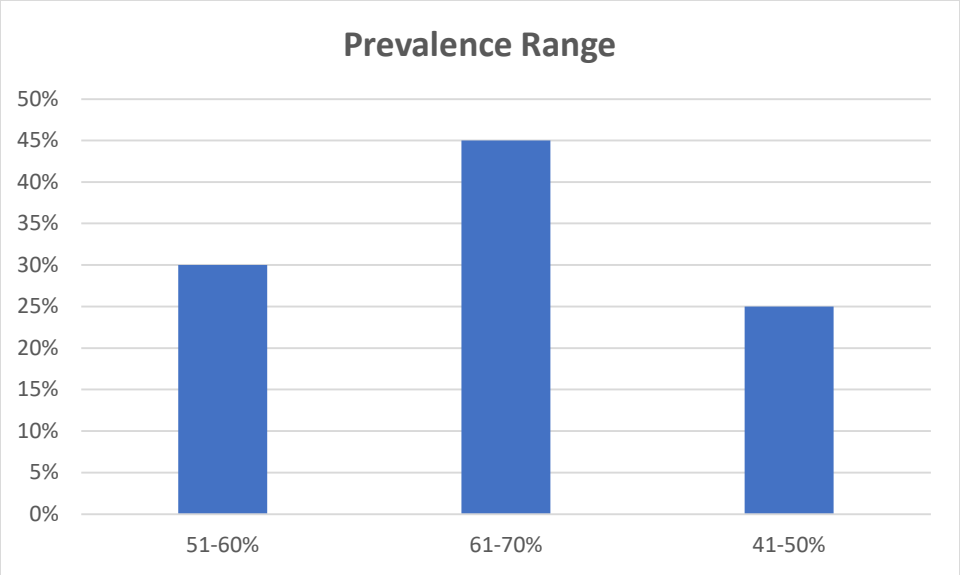


**Fig :5 Prevalence of Forward Head Posture Among Smartphone Users**

## Process for Systematic Review on Forward Head Posture

1) **Formulate Research Question:**

   Define the goal: Prevalence of ahead head posture amongst cellphone users.

2) **Screening and Selection:**

   - **Include:** Prospective, controlled, or uncontrolled intervention trials.
   - **Exclude:** Retrospective research, case reviews, professional reviews.

3) **Literature Search:**

   Search databases: Google Scholar, PubMed, Elsevier.

4) **Data Extraction:**

   **Extract relevant data:** Prevalence prices, take a look at consequences, sample sizes.

5) **Data Analysis:**

   - Analyze data to decide incidence degrees.
   - Identify patterns and commonplace findings.

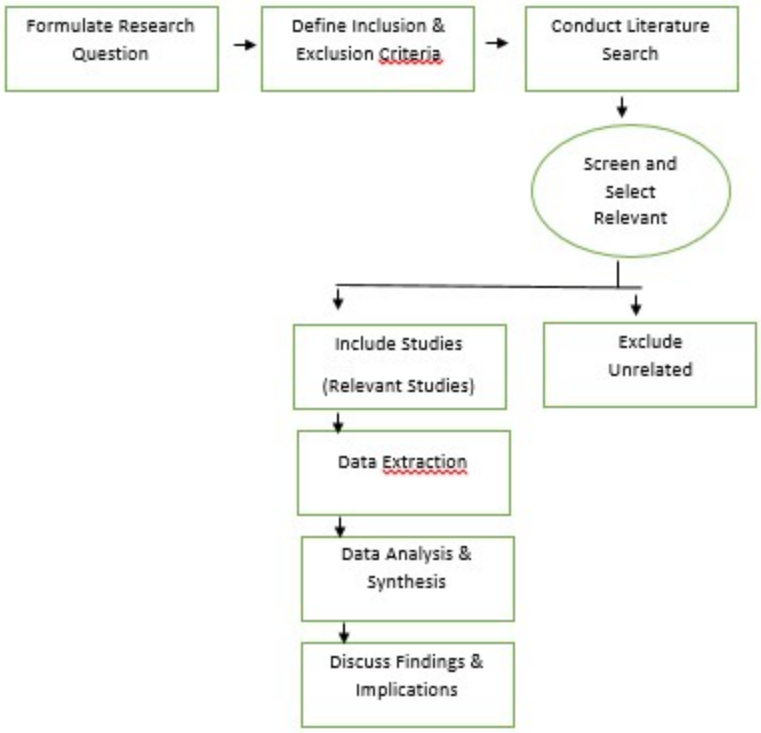


**Fig :6 Process for Systematic Review on Forward Head Posture.**

## VI. Conclusion:

The systematic assessment on the superiority of Forward Head Posture (FHP) amongst smartphone customers reveals a regarding sample of excessive incidence charges related to great phone use. The evidence synthesized from numerous studies suggests that extended use of smartphones considerably contributes to the development of FHP, a situation marked by using terrible cervical posture and head flexion. This posture is typically located in each adolescents and adults, reflecting the sizable effect of smartphone usage on postural fitness.

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**Table 2: Summary of Findings from Reviewed Studies**

| Key Aspect | Details |
|---|---|
| **Prevalence Rates** | High prevalence of FHP among smartphone users; rates vary across studies. |
| **Common Findings** | Significant association between smartphone use and FHP; links to neck pain and poor posture. |
| **Study Gaps** | Lack of long-term studies and effective intervention strategies. |
| **Recommendations** | Implement ergonomic interventions; raise awareness about proper posture; conduct further longitudinal research. |
| **Future Directions** | Explore long-term effects of FHP; develop and test effective preventive measures. |

The assessment highlights that telephone customers, mainly individuals who engage in prolonged or recurring use, are at an increased danger of growing FHP. The prevalence charges mentioned throughout one-of-a-kind research show substantial version however continually factor to a widespread proportion of users suffering from terrible cervical posture. This situation not most effective impairs posture however additionally affects the overall best of life, main to soreness and capacity lengthy-term musculoskeletal troubles. The proof shows that the developing fashion of phone use is exacerbating those posture-associated troubles, underscoring the need for preventive measures.

Moving forward, destiny studies need to cognizance on longitudinal studies to assess the long-time period consequences of FHP and evaluate the effectiveness of various interventions. Understanding how FHP develops through the years and figuring out powerful techniques to counteract it will be critical for addressing this full-size problem. By expanding studies and enforcing centered interventions, it's miles feasible to mitigate the bad affects of phone use on posture and beautify the properly-being of users globally.

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