Mobile nutrition tracking applications have experienced explosive growth over the past decade, with millions of users worldwide relying on platforms like MyFitnessPal, LoseIt! and Noom to monitor their dietary intake. These applications typically operate on a calorie counting model, requiring users to log every food item consumed and presenting detailed nutritional breakdowns in numerical format. While proponents argue that such granular tracking promotes awareness and accountability, a growing body of research suggests that calorie counting applications may have unintended negative consequences, particularly for individuals vulnerable to disordered eating patterns.

This literature review examines the current evidence surrounding nutrition tracking applications, with specific focus on their psychological impact, user satisfaction, alternative dietary approaches, and technical implementation considerations. The review is structured around four key themes that inform the design and rationale for this project. First, it explores the documented psychological harms associated with calorie counting applications, establishing why traditional tracking approaches may be problematic for certain user populations. Second, it examines user perspectives on existing nutrition apps, identifying gaps between current offerings and user needs through analysis of both academic research and user experience studies. Third, it investigates intuitive eating as an evidence-based alternative framework that avoids the pitfalls of restrictive numerical tracking while still supporting healthy dietary behaviours. Finally, it reviews mobile health application development considerations, including behaviour change techniques, native versus cross-platform development approaches, and design principles for serving vulnerable populations ethically and effectively.

Understanding these themes is essential for this project, which aims to develop a native android mobile application using Java that provides personalized nutritional guidance through qualitative feedback rather than calorie counts. The technical decision to use native Android development rather than cross-platform approaches must be justified within the context of mobile health application literature, particularly regarding time constraints, development expertise, and practical feasibility. By synthesizing evidence from eating disorder research, nutrition science, user experience studies, mobile health literature, and software engineering research, this review establishes the theoretical and technical foundation for the project.

This review identifies a critical research gap: the absence of nutrition tracking tools designed explicitly to support healthy eating behaviours without reinforcing obsessive monitoring or triggering disordered eating patterns, implemented in a way that balances technical performance with practical development feasibility. The following sections examine how existing literature informs the design, development approach, and evaluation of such an application.

# 2.2 Theme 1: Psychological Harm Associated with Calorie Counting Applications

Mobile calorie counting applications have become universal tools for weight management, with apps like MyFitnessPal reporting over 200 million users worldwide. However, emerging research suggests these applications may cause psychological harm, particularly among vulnerable populations. This section examines the evidence for negative outcomes associated with calorie tracking apps, as understanding these harms is essential for designing safer alternatives that provide nutritional guidance without triggering problematic behaviours.

## Qualitative Evidence from Eating Disorder Communities

Eikey et al. (2021) conducted a qualitative study examining how individuals in eating disorder recovery experienced calorie counting applications. Through semi-structured interviews with 20 participants recruited from eating disorder online communities, the researchers explored the relationship between app use and disordered eating behaviours during recovery. Participants reported that calorie counting apps triggered obsessive thoughts about food, reinforced restrictive eating patterns, and provided a sense of control that became psychologically addictive. Notably, even participants who were in recovery and explicitly trying to avoid triggering content found the apps' numerical feedback impossible to ignore once they had begun using these tools. Several participants described calorie counting apps as "relapse triggers," with one stating that the apps made it "too easy" to fall back into restrictive patterns.

The study employed thematic analysis to identify recurring patterns across participants' experiences, strengthening the validity of findings through systematic coding and inter-rater reliability checks. However, the small sample size and self-selected participants individuals who chose to discuss their negative experiences mean findings may not generalize to all users or those without eating disorder histories. Additionally, the retrospective nature of interviews introduces potential recall bias. Despite these limitations, the study's strength lies in its direct engagement with the target population most at risk, providing authentic lived experiences rather than theoretical speculation about potential harm. For this project, Eikey's findings validate the core design decision to eliminate calorie counts entirely. Participants explicitly stated that the presence of numerical targets was the primary psychological trigger, suggesting that qualitative feedback mechanisms could avoid this specific harm pathway while still providing meaningful nutritional information.

## Quantitative Evidence from University Populations

Building on qualitative insights, Hahn et al. (2021) investigated the relationship between calorie tracking app use and disordered eating symptoms among university students through a quantitative survey design. Their study of 493 undergraduate students found that frequent app users reported significantly higher scores on the Eating Disorder Examination Questionnaire (EDE-Q) compared to non-users, even after controlling for baseline eating concerns and demographic variables. The effect size was moderate, indicating a meaningful relationship between app use frequency and symptom severity. Importantly, the association remained significant across different app types, suggesting the harm mechanism relates to the calorie counting behaviour itself rather than specific app features.

The study's cross-sectional design represents a key limitation, it cannot establish causality, leaving open the possibility that individuals with existing eating concerns are simply more likely to use tracking apps rather than apps causing the concerns. However, participants' self-reported motivations for app use revealed that 68% began tracking for general health or fitness goals rather than weight loss, suggesting many users without pre-existing vulnerabilities may develop problematic relationships with tracking over time. The university student population, while convenient for recruitment, may not represent the broader adult population, particularly older adults or those outside academic environments. Nevertheless, university aged individuals (18-25 years) represent a demographic at elevated risk for eating disorder onset, making them a relevant population for understanding app-related harms.

For this project, Hahn's work emphasizes the need to design for users who may not initially recognize themselves as vulnerable to disordered eating. The finding that health-motivated users develop problematic patterns suggests that harm prevention cannot rely solely on warning labels or self-selection the app's fundamental approach to presenting nutritional information must be non-triggering by design.

## Mechanisms of Harm in Popular Applications

Linardon and Messer (2019) examined MyFitnessPal specifically, investigating how features of the world's most popular calorie tracking app correlate with eating disorder symptoms. Their online survey of 493 MyFitnessPal users revealed that certain app features were particularly associated with disordered eating psychopathology. Users who engaged heavily with the app's social comparison features (comparing their intake to friends), frequently checked nutritional breakdowns throughout the day, and set aggressive calorie restriction targets showed elevated scores on standardized eating disorder measures. The "compulsive checking" behaviour opening the app multiple times per hour emerged as a particularly strong predictor of eating pathology.

The study utilized validated psychometric instruments (EDE-Q and Compulsive Exercise Test), lending credibility to symptom assessments. However, the correlational design again limits causal inference, and the sample consisted entirely of active MyFitnessPal users recruited through the app's forums, potentially biasing results toward more engaged or problematic users. The study also relied on self-report data for both app usage patterns and eating disorder symptoms, introducing potential social desirability bias. Despite these limitations, Linardon and Messer's identification of specific high-risk features provides actionable insights for alternative app design.

Their findings suggest that numerical precision itself may be problematic users described becoming "obsessed" with hitting exact calorie targets and feeling extreme distress when exceeding limits by even small amounts. This points to a fundamental issue with calorie-based tracking: the false precision creates an illusion of control while increasing rigidity around food choices. For this project, the implication is clear. Removing exact numbers and numerical targets may reduce compulsive monitoring behaviours while still allowing users to understand their nutritional patterns through qualitative categories.

## Synthesis and Implications

Collectively, these studies establish a consistent pattern: calorie counting applications can contribute to disordered eating behaviours, obsessive food monitoring, and psychological distress, with effects particularly pronounced among individuals with existing vulnerabilities but also observable in general populations. The evidence suggests that numerical, restrictive tracking interfaces represent the primary harm mechanism rather than the concept of dietary awareness itself. Qualitative data from lived experiences (Eikey et al., 2021), quantitative associations in at-risk populations (Hahn et al., 2021), and feature-specific correlations in popular apps (Linardon & Messer, 2019) converge on the same conclusion: the way nutritional information is presented matters profoundly for psychological outcomes.

This creates a clear imperative for alternative approaches that provide nutritional guidance without triggering obsessive counting behaviours. The gap in current offerings is not simply a matter of adding warnings or parental controls to existing apps, but rather fundamentally rethinking how dietary information is communicated to users. A qualitative feedback system that informs users about nutritional patterns without numerical precision, represents a theoretically grounded alternative that addresses the specific harm mechanisms identified across these studies.