Evaluating the quality of medication adherence mobile apps

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Background

- Motivated by the widespread problem of medication non-adherence, smartphone adherence apps are now abundantly available.[1,2]
- Identifying the most useful app is a challenge for clinicians and patients due to insufficient evidence on the clinical efficacy of such apps, and concerns over issues of privacy and reliability.[1,3]
- The objective of this study is to evaluate the quality of medication adherence apps in the major app stores.

Methodology

- A quality assessment tool comprising of 24 items was developed (total score = 43).
- Medication adherence apps identified through a systematic search on Google Play and iTunes were evaluated using this tool in terms of their content reliability, feature usefulness, feature convenience and overall quality (Fig. 1).
- Two evaluators independently rated the eligible apps.

Apps retrieved by the search on Google Play and iTunes*:
N = 1115 [Android: n = 871 and iOS: n = 244]

Apps with medication reminder feature (after exclusion of 381 duplicates and 251 apps with no reminder feature) = 483
[Android: n = 326 and iOS: n = 157]

Apps downloaded to test devices for evaluation:
n = 47 [20 apps common for both Android and iOS]

Final analysis based on 39 apps**
[Android: n = 19 and iOS: n = 20]
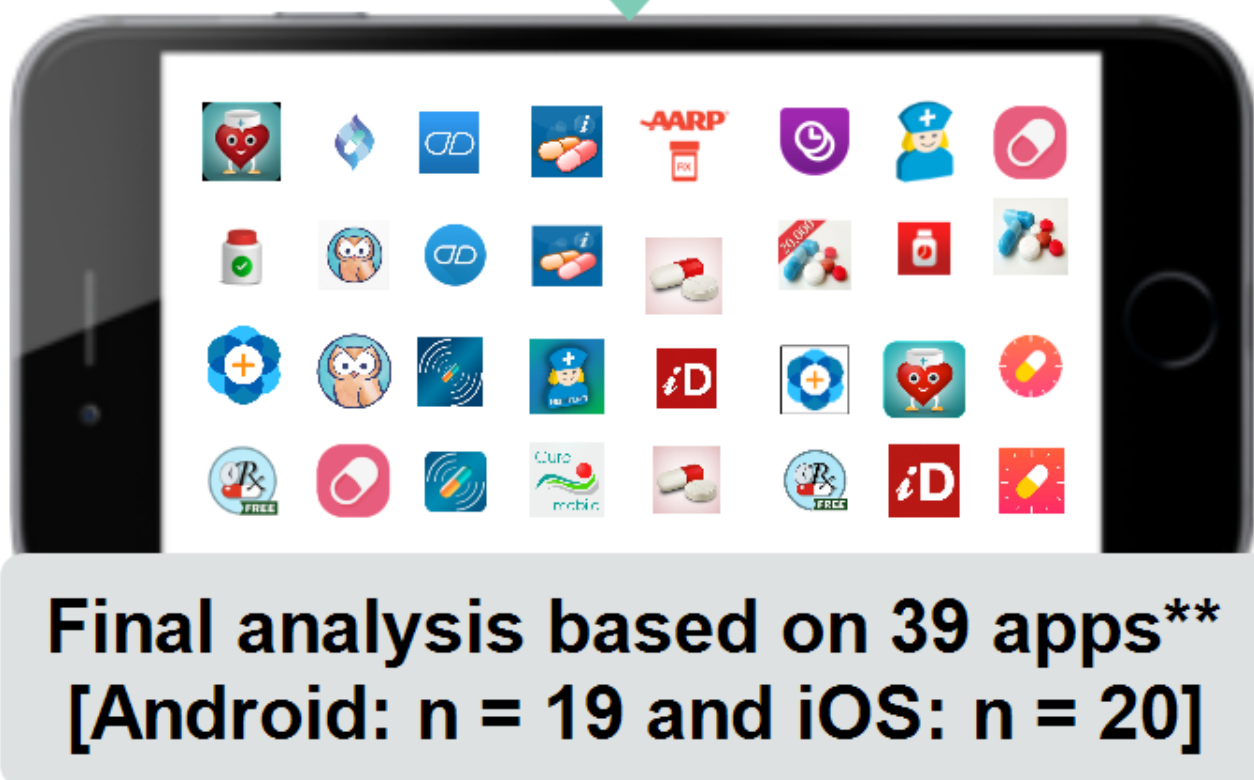
* Search terms used: "medication adherence", "medication compliance", "medication reminder" and "medicine reminder"
** Inclusion criteria were: presence of medication reminder, ability to manage multiple medications for multiple diseases, availability on both iOS and Android, published in English and no technical problems.

Fig. 1. Flowchart of the app search and review process

Results

Overall scores of apps

- More than half of the evaluated apps (12 iOS, 60%; 12 Android, 63.2%) scored ≤ 21/43 (48.8%) (Fig. 2).
- Only 4 apps from each platform scored ≥ 27/43 (62.8%) and none scored more than 28/43 (65.1%).
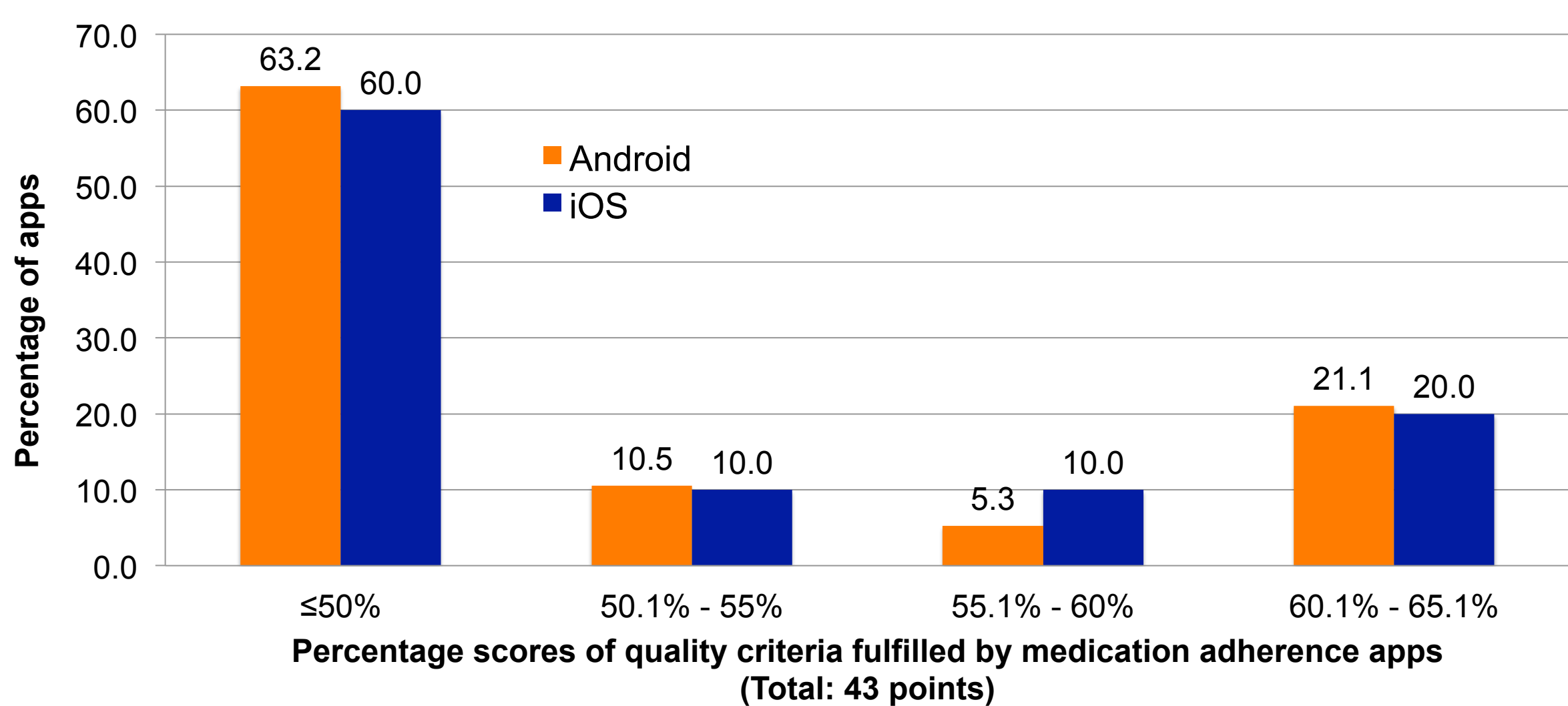

Fig. 2. Overall scores of adherence apps by platform (n = 39)

Characteristics of the highest scoring apps

- The top ranked apps on both platforms were AARP Rx, CareZone, GenieMD and Medisafe (Figs. 3 and 4)
- Although GenieMD and Medisafe had better performance in terms of feature usefulness, they did not score as well in terms of feature convenience (1/3 and 2/3 respectively)
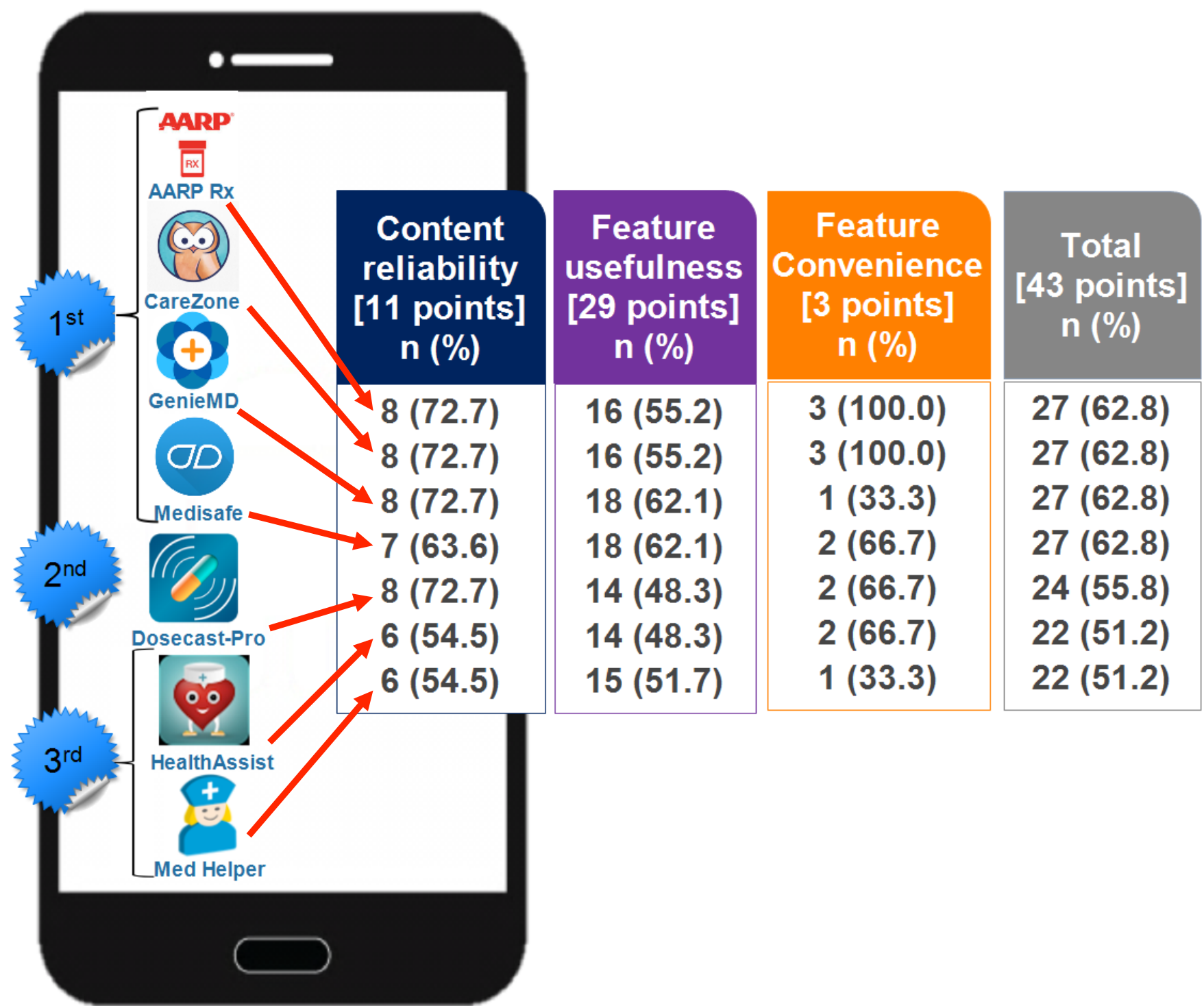

App	Content reliability [11 points] n (%)	Feature usefulness [29 points] n (%)	Feature Convenience [3 points] n (%)	Total [43 points] n (%)
AARP Rx	8 (72.7)	16 (55.2)	3 (100.0)	27 (62.8)
CareZone	8 (72.7)	16 (55.2)	3 (100.0)	27 (62.8)
GenieMD	8 (72.7)	18 (62.1)	1 (33.3)	27 (62.8)
Medisafe	7 (63.6)	18 (62.1)	2 (66.7)	27 (62.8)
Dosecast-Pro	8 (72.7)	14 (48.3)	2 (66.7)	24 (55.8)
HealthAssist	6 (54.5)	14 (48.3)	2 (66.7)	22 (51.2)
Med Helper	6 (54.5)	15 (51.7)	1 (33.3)	22 (51.2)

Fig. 3. Characteristics of the top ranked Android apps

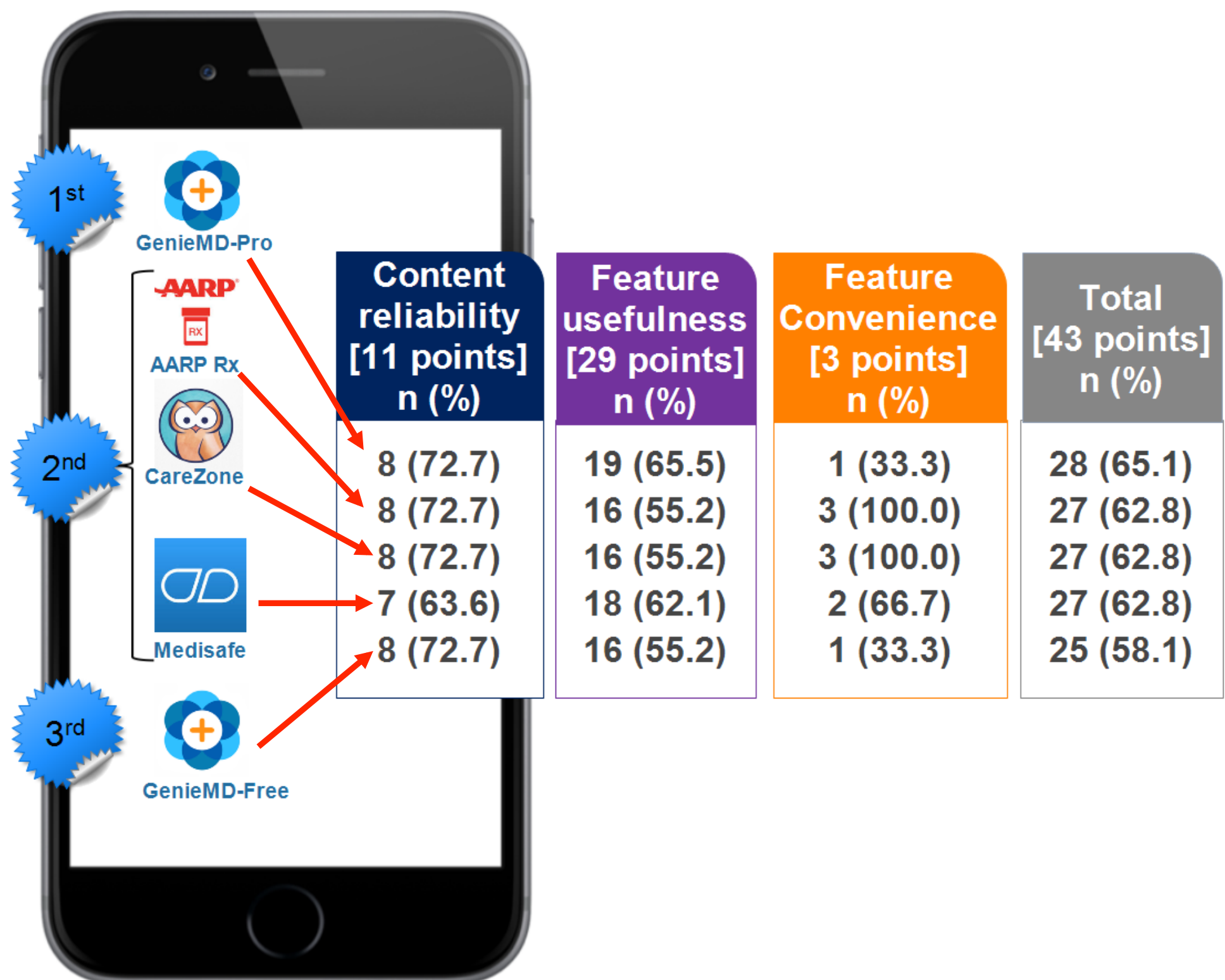| App	Content reliability [11 points] n (%)	Feature usefulness [29 points] n (%)	Feature Convenience [3 points] n (%)	Total [43 points] n (%)
GenieMD-Pro	8 (72.7)	19 (65.5)	1 (33.3)	28 (65.1)
AARP Rx	8 (72.7)	16 (55.2)	3 (100.0)	27 (62.8)
CareZone	8 (72.7)	16 (55.2)	3 (100.0)	27 (62.8)
Medisafe	7 (63.6)	18 (62.1)	2 (66.7)	27 (62.8)
GenieMD-Free	8 (72.7)	16 (55.2)	1 (33.3)	25 (58.1)

Fig. 4. Characteristics of the top ranked iOS apps

Main deficiencies of the apps

- None of the apps had features for self-management of side effects and convenient scheduling of medication tapers.
- Some adherence-enhancing features, such as alerts for missed doses and medication and disease information were available only in a small proportion of the evaluated apps (Fig. 5).
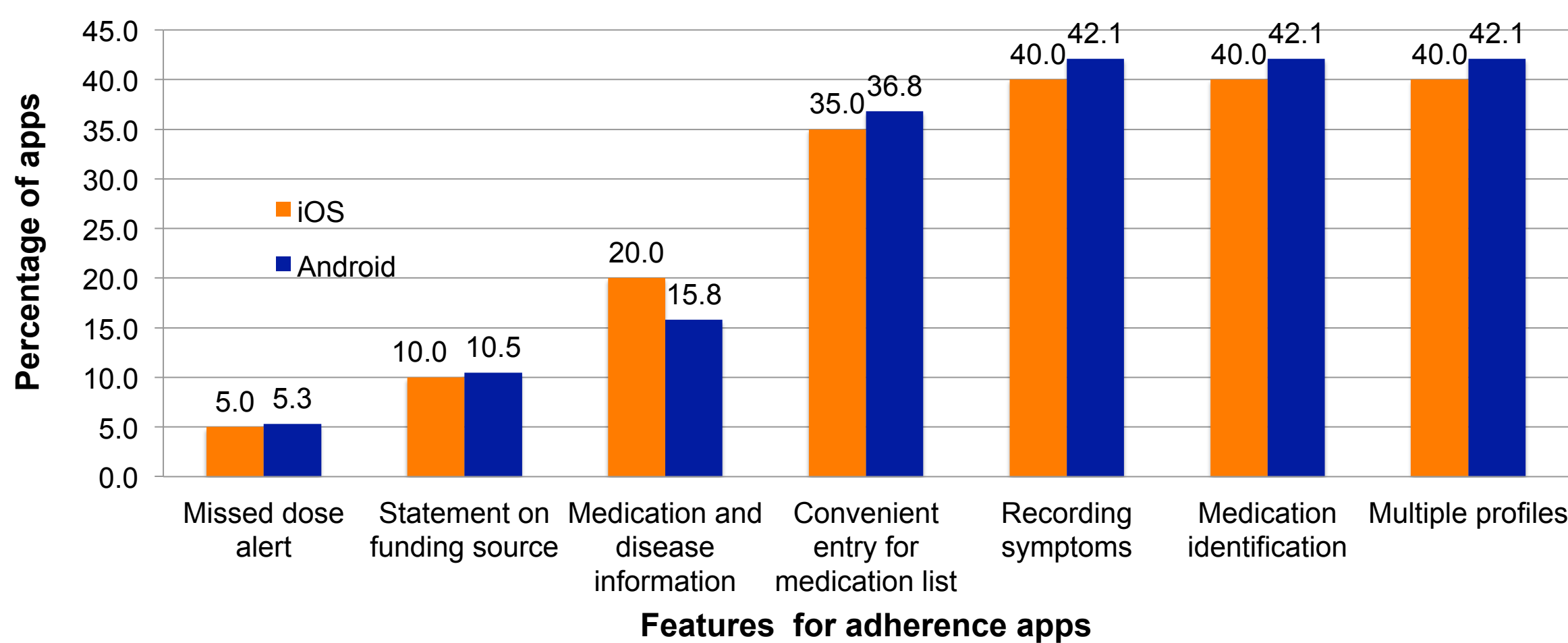

Fig. 5. Features that were less common among evaluated apps

Conclusion

- GenieMD, AARP Rx, CareZone and Medisafe were the best performing apps based on overall quality scores, thus clinicians can potentially recommend these apps to patients who have difficulty maintaining optimal medication adherence.
- Developers of adherence apps should consider features that provide therapy-related information and help patients in medications and side-effects management.

References

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2. Osterberg L, Blaschke T. Adherence to medication. N Engl J Med. 2005;353(5):487-97.
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