

スマートフォンアプリ「STI OMOIYARI」を用いた性感染症関連情報調査

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研究要旨

HIV 感染症を中心とした性行為感染症の情報を収集・分析するために、Apple 社の性感染症啓発アプリを作成しリリースした。携帯情報端末のアプリケーション（アプリ）を用いた性感染症診療情報データ収集の報告はなく、全国から瞬時に大量のデータを収集できるアプリを用いた、世界の先駆けとなる研究である。

アプリの使用により、530 名のうち 155 名（29.2%）に行動変容が得られた。40 歳以上のアプリ使用者は「検査を受ける」という行動変容が有意に少なかった。「感染歴あり」や「性教育を受けたことがある」と回答した使用者では、「コンドームをつける」行動変容を起こしやすかった。25 歳～30 歳は、「アプリの使用の友人への推奨」という行動が有意に多かった。

本研究により、日本人の性行動や性感染症検査受診歴が正確に解析された。アプリによる行動変容が可能な集団と難しい集団を明らかにすることができた。今後、総合診療/プライマリケア医が HIV 感染症等の性感染症啓発を行う際の、重要な基盤データが得られた。

A. 研究目的

本邦では HIV 感染症等の性感染症（Sexually Transmitted Infections）の蔓延が問題となっており、先進国で唯一、HIV の新規感染者の増加に歯止めがかからない状況である。しかし、総合診療医/プライマリケア医の STI に対する知識は不十分であり、その教育のための基盤データも整備されていない。

2015 年に、Researchkit という研究者用のオープンフレームワークが Apple 社より発表された。これを利用して作成されるアプリは被験者の募集をシンプルなものにし、携帯情報端末を使用する被験者がどこにいても簡単に研究に参加でき、

その結果大規模で多様な被験者を得やすくすることができる。我々は、本邦における携帯電話領域で大半のシェアを有する iPhone のアプリを用いることで多数のデータ収集が可能になることを報告している（Fujibayashi K, JMIR Mhealth Uhealth, 2018）。近年、情報技術を用いた調査は、情報の収集速度と収集される情報量の多さにより、既存の研究方法を補完できる事も示されている。

本研究では患者背景情報や性感染症罹患時の情報を携帯情報端末から同時に収集する。情報入手の方法上自記式アンケートになるため、情報の正確性には限界があるが、インターネットの検索クエリ

データに比較するとより直接的に性感染症罹患者の推定が可能と考えられる。更に、スマートフォンユーザーを対象にした研究であるため、性感染症に罹患しなかった被験者の情報も収集される。そのため、今まで不明瞭であった性感染症罹患患者数の推測や性感染症ワクチンの有効性、性感染症罹患/重症化リスクを評価する事が可能となる。我々の検索しうる範囲では、携帯情報端末のアプリを用いた性感染症関連情報データ収集の報告はない。

本研究は、世界で先駆けとなる携帯情報端末アプリで、研究参加者の性感染症罹患に関連する調査データ集積を試みることを目的とした。本アプリを利用することにより、受診やワクチン接種などへの有用な行動変化が起きるかを検討する。さらには、STIの多くがコンドームの使用によって防げることをアプリを通じ理解してもらい、アプリの使が行動変容に寄与したかを調べる。

B. 研究方法

17歳以上の携帯情報端末スマートフォンユーザー全てを対象に被験者を公募した。初めに研究に同意された方に今回開発するスマートフォンアプリのフレームワークで作製した性感染症関連情報アプリを用いて、アプリに記載されているアンケート調査に入力してもらった。

被験者が性感染症に罹患している場合、罹患した事、診断された疾患名を入力してもらい、研究実施期間が終了した時点でデータベースに入力されている情報を解析して、本邦の性感染症罹患患者数、罹患患者の予測数、性感染症に対する知識、被験者の性感染症罹患/重症化リスクを明

らかにする。また、主評価項目の検討後、副評価項目についても合わせて解析する。各評価項目は95%信頼区間を算出し、評価する。



(図 1. アプリケーション案内)



(図 2. アプリケーション画面)

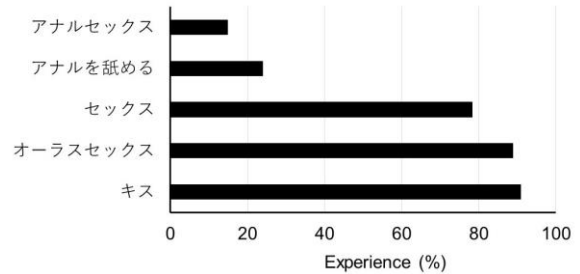
日本在住でスマートフォンを使用しており、Apple社のApp StoreからSTIチェックをダウンロードして調査に同意した症例を対象に調査を行う。

観察および検査項目としては、被験者基本情報：性別、年齢、学歴状況（最終学歴）、収入、性感染症検査実施の有無、性教育の有無、検査理由、既往歴（性感染症の既往有無、罹患疾患：梅毒、性器ヘルペス、HIV感染症、B型肝炎、A型肝炎、クラミジア、淋菌、尖圭コンジローマ）、ワクチン接種の有無（A型肝炎、B型肝炎、ヒトパピローマ）、性交経験（有無、相手性別）、国籍、性風俗の利用経験、性風俗の従事経験、本アプリダウンロードの理由、性行為または関連する行為、罹患時もしくは罹患のリスクが想像できる随伴症状(リンパ節の腫れ、赤い発疹、シコリ、痛みのないできもの、発熱、だるさ、小さなイボ、痛みを伴う水泡、咽頭痛、吐き気、黄疸、排尿時の違和感、排尿時の痛み、透明な膿（おりもの）白色の膿（おりもの）、関節痛)、避妊の有無、性行為直近実施時期（数日前、数週間前、数ヶ月前、1年前）、意欲状況：アプリ実施後の性感染症への検査受診意欲、ワクチン接種意欲、避妊意欲、それぞれの意欲変化を自己申告、アプリ推奨意欲の確認、とした。

C. 研究成果

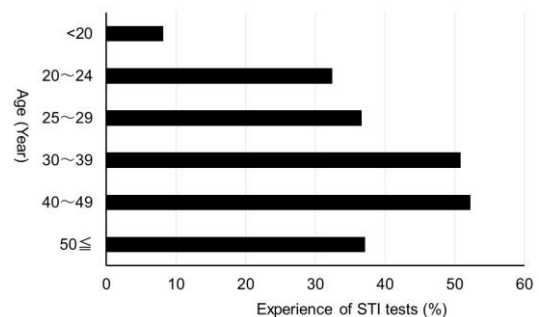
本アプリを使用し、研究に承諾した726名のデータを解析した。その中の204名については連結データを用いて行動変容を調査することができた。年齢は20歳～30歳が最も多く、性別は女性が42.3%であった。

性行為について「経験なし」は4.1%、キス90.9%、セックス88.8%、オーラルセックス78.2%、アナルを舐める24.0%、アナルセックス14.9%であった（図3）。



(図 3) 経験のある性行為

過去の性感染症検査は37.2%が「あり」と回答した。30歳～50歳の世代 ($p < 0.001$) と女性 ($p < 0.001$) で有意に検査経験が多かった（図4）。検査理由は「心配になった」が最大で22.5%であり、「定期的に検査している」は3.0%のみだった。



(図 4) 年齢別の性感染症検査経験

性教育については74.5%が「経験あり」と返答した。年齢が若い世代 ($p < 0.001$)、女性 ($p < 0.001$) ではより多く「性教育を受けている」と答えていた。

ワクチン接種は70.4%であり、B型肝炎ワクチン21.8%、HPVワクチン12.4%、A型肝炎ワクチン6.5%であった。

「検査を受けるという行動変容」においては「40～49歳」で有意に低かった (OR=0.16、 $p = 0.017$)。性感染症予防

のワクチンを受けるという行動変容に影響した変数は無かった。「コンドームをつけるという行動変容」と関連があったのは、「性教育あり」で (OR=3.14、p = 0.028) であった。「本アプリを友人に勧める」という行動変容と関連があったのは、アプリのインストール理由が「興味／関心」であることのみであった (OR=5.84、p = 0.028)。

D. 考察

本研究データから、年齢、性別と性教育の有無に有意な関連があることが示された。性教育を受けているほうがアプリによる「コンドームをつけるという行動変容」が有意に起きやすい結果でもあり、今後も学校等での性教育を継続することの重要性が明確になった。

40～49歳の年齢カテゴリは「検査を受ける行動変容」を起こしにくい結果となった。対面での総合診療/プライマリケア医による啓発活動においても、重要な問題である。今回用いたような啓発アプリで性感染症予防のワクチン接種を促進するのは難しい、との問題点も明らかになった。

E. 結論

iPhoneのアプリを用いることにより、本邦のリアルワールドの性的活動や性感染症の検査状況が明らかになった。30歳未満や50歳以上、男性での検査実施経験が低いため、これらの対象者を重点的に啓発する必要がある。アプリによる行動変容が可能な集団が明確になったため、総合診療/プライマリケアにおいて、今後はさらに Information and Communication Technology を有効に用

いて診療を行っていくべきである。

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