Computer Tablet or Telephone? A Randomised Controlled Trial Exploring Two Methods of Collecting Data from Drug and Alcohol Outpatients

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Abstract

Objective: Both computerised and telephone surveys have potential advantages for research data collection. The current study aimed to determine the: (i) feasibility, (ii) acceptability, and (iii) cost per completed survey of computer tablet versus telephone data collection for clients attending an outpatient drug and alcohol treatment clinic. *Design:* two-arm randomised controlled trial. *Method*: Clients attending a drug and alcohol outpatient clinic in New South Wales, Australia, were randomised to complete a baseline survey via computer tablet in the clinic or via telephone interview within two weeks of their appointment. All participants completed a three-month follow-up survey via telephone. *Results*: Consent and completion rates for the baseline survey were significantly higher in the computer tablet condition. The time taken to complete the computer tablet survey was lower (11 minutes) than the telephone condition (17 minutes). There were no differences in the proportion of consenters or completed follow-up surveys between the two conditions at the 3-month follow-up. Acceptability was high across both modes of data collection. The cost of the computer tablet condition was $67.52 greater per completed survey than the telephone condition. *Conclusion*: There is a trade-off between computer tablet and telephone data collection. While both data collection methods were acceptable to participants, the computer tablet condition resulted in higher consent and completion rates at baseline, therefore yielding greater external validity, and was quicker for participants to complete. Telephone data collection was however, more cost-effective. Researchers should carefully consider the mode of data collection that suits individual study needs.

Key Words: Data collection, epidemiologic methods, substance-related disorders, tablet computers, telephone.

1. Introduction

AOD facilities provide researchers with the opportunity to conduct research during various stages of the treatment process to improve outcomes. However, the rigour of such research relies upon high participant recruitment and retainment rates to ensure a representative sample while minimising bias[1]. It is therefore important to consider the population under investigation and the impact of different methods for engaging and retaining participants when designing studies. Pen-and-paper surveys are commonly used for collecting data in behavioural research, but the limitations of this method may influence the representativeness of the data collected, including: low response rates, data inaccuracy, and lower acceptability compared to other modes of data collection[2,3]. Exploring alternative methods for data collection can assist researchers in overcoming such limitations.

Computerised data collection offers an alternate to pen-and-paper surveys within clinical settings[4-7]. Compared to pen-and-paper surveys regarding AOD use, computerised data collection has shown: less data distortion[8], greater proportions of usable data for AOD questions[9] and greater reporting of alcohol consuming days[10]. Despite potential advantages, the consent rates, acceptability and cost of computerised data collection among an AOD clinical setting is currently unknown. Telephone interviews are another method of data collection which have demonstrated: greater data completeness than pen and paper surveys[11]; convenient scheduling time for participants; and minimal literacy requirements[12]. Deane et al.[13] examined the feasibility of telephone data collection among addiction recovery services and found the three-month follow-up rate was 51% and each completed survey cost US$82. However, in this study telephone data collection was used for follow-up data only, with baseline data collected via clinical interview. Morrison et al.[14] examined three methods of collecting daily reports of alcohol consumption among a sample of college students and

found telephone calls initiated by researchers had a greater number of incomplete reports but daily reports via pen-and-paper had a greater number of missing items for each report.

While both computerised and telephone data collection have been compared to pen-and-paper methods[9,10,14], the feasibility, acceptability and cost of computerised versus telephone data collection in an AOD setting has not yet been examined. Parks et al.[15] compared these two methods for examining alcohol use among a sample of college women, and found completion to be higher and cost to be lower using a web-based survey. Whether this finding translates to an AOD treatment setting is unknown. In addition, the advancement of computer tablet technologies allows researchers a convenient method of conducting point of care data collection which has shown higher response rates compared to emailed surveys in primary care[16]. Point of care data collection is a benefit that cannot be replicated for interviews conducted via telephone. Previous research in primary care, however, reported that computer tablets require assistance to complete and are associated with incomplete survey data, which may be overcome through telephone data collection[16]. Examining the differences between these two methods and understanding which method yields the largest sample will have implications for conducting methodologically rigorous research in this settings. This study therefore aimed to determine the: (i) feasibility, through consent and completion rates; (ii) acceptability; and (iii) cost of an in-clinic computer tablet survey vs post-clinic telephone survey for gathering data from clients attending an outpatient AOD treatment clinic.

2. Method

2.1 Ethics Approval. The Hunter New England Human Research Ethics Committee (15/06/17/4.02) and the University of Newcastle (H-2015-0414) granted full ethical approval for this research.

2.2 Design. Single-site two-arm cluster randomised controlled trial.

2.3 Setting. The study was conducted in one outpatient AOD clinic located within a public hospital located in NSW, Australia. The clinic provided care for 6,183 outpatient occasions during 2014-15.

2.4 Participants. Eligible clients were: (i) attending for treatment at the participating AOD clinic; (ii) aged over 18 years; (iii) proficient in English; (iv) presenting for their initial consultation; and (v) had a telephone contact number. Clients were ineligible if clinic staff judged them to be: (i) too ill, (ii) distressed, (iii) under the influence of drugs or alcohol, or (iv) otherwise unable to provide informed consent.

2.5 Randomisation. A computerised random number generator was used to randomise days of the week to the telephone or computer tablet condition using a 1:1 ratio. All study days were included as individual units and therefore allocation for each day of the week varied. This process was chosen over individual randomisation of participants to reduce reception staff burden and the likelihood of contamination.

2.6 Procedure.

Clinic staff approached clients presenting for their appointment. A member of the research team (BH) provided staff with a 30-60 minute recruitment training session involving information about study documents and demonstrating procedures for each condition. The initial recruitment days were overseen by a member of the research team.

The recruitment process varied depending upon experimental condition, however, the survey content was identical for both groups. Briefly, the survey consisted of demographic questions, questions regarding substances used in the previous 14 and 30 days, the substance treatment was being sought for, whether treatment had previously been sought for alcohol problems, and if so, the number of times. Alcohol consumption was measured using the quick

drinking screen [17] and a 14-day timeline follow-back [18]. The Patient Health Questionnaire (9-items)[19] was used to assess depression. Clients completed a baseline survey via computer tablet or telephone and a three-month follow-up survey via telephone. Questions on past treatment and some demographics were removed from the follow-up survey to avoid repetition, all other measures remained the same.

2.6.1. In-clinic computer tablet condition. Clinic staff verbally informed clients of the study and provided them with the information statement and computer tablet during intake. Clients completed the touchscreen computer tablet survey in the waiting room. Staff recorded the age and gender of those who chose not to initiate the computer tablet survey. Age and gender were collected via the survey, and then an overview of the study was presented onscreen. Clients were presented with the question "Do you agree to participate in this survey?" with a 'Yes' or 'No' response. Those who responded "Yes", received the survey questions. Participants were given the option of completing the survey after their appointment if they were called in before finishing.

2.6.2 Post-clinic telephone condition. Clinic staff verbally informed clients of the study and provided them with the information statement. Clients willing to receive further information about the study completed a 'consent for contact' form detailing their name, phone number and signature. The clinic staff documented age and gender of those who chose not to complete the form. Forms were collected from the clinics regularly and clients were followed-up within 14-days. Up to 5 calls were made, at varying times of the day, to reach participants (unless call backs were requested) during the 14-day follow-up period Clients who were unable to be reached were recorded as lost to follow-up. Clients that could be reached were given further information about the study. Consenting clients were then given the option of completing the interview during the initial phone call or scheduling a call back.

2.6.3 Follow-up. All clients were followed up via telephone 3 months after completing the baseline survey. The computer tablet condition were given an option at the end of the survey to provide a contact number for follow-up, as well as a secondary contact in case the client was unreachable. Participants in the telephone condition were asked by the interviewer if they consented to a follow-up survey and offered the option of providing a secondary contact. A member of the research team telephoned participants in both conditions to administer the follow-up survey. Participants were considered lost to follow-up if they could not be reached within 2 weeks of the 3 month follow-up date.

2.7 Outcomes.

2.7.1 Feasibility. Survey feasibility was the primary study outcomes, measured through: consent to baseline survey; completion of baseline survey; consent to follow-up; and completion of follow-up. Staff recorded the number of approached clients via daily log sheets. Those who indicated 'Yes' to the study on the computer tablet survey or to the researcher over the telephone were considered consenters. A survey was considered complete if no answers were missing. Completion time was automatically recorded using the survey programme or through telephone call details.

2.7.2 Acceptability. Both conditions were given four questions regarding acceptability. Clients responded "Yes" or "No" for whether they agreed with the following statements:

"*The instructions were easy to follow"*

"*The Questions were easy to understand"*

"*Had enough time to complete all the questions"*

"*Felt comfortable answering all the questions"*

The computer tablet had an additional three questions specifically related to the acceptability of using the computer tablet:

> *"Thought the touchscreen was easy to use"*
>
> *"Thought the touchscreen allowed enough privacy"*
>
> *"If you were asked to complete a similar survey on an iPad in the future, would you be willing?"* [Responses: "Yes", "No" or "Unsure"].

2.7.3 Cost Analysis. Costing was based on the resources required for survey administration and directly expended by the research team. Reception staff recruitment costs and the printing of information sheets were not included in the study cost as these were equal across both conditions. The computer tablet condition costs involved equipment and survey programming. The telephone data collection costs involved printed materials, call rates and researcher time spent conducting the telephone interviews. The date, time and outcome of each telephone call made to participants were recorded. Overheads for salary were included in wage calculations to allow for on-costs of employment such as leave and superannuation. Current professional pay rates at the University of Newcastle were used to calculate hourly wages. Combining the costs stipulated above allows for an estimation of total monetary costs, based on 2016 Australian dollars, for each condition. Costs were calculated as an overall rate for each condition and then per participant.

2.8 Data Analysis. The proportion of participants that were approached that consented into the study was compared between study conditions using a generalised linear model, with a binomial distribution and an identity link. As the randomisation was by study day, potential design effect was accounted for by estimating cluster robust standard errors. A similar model was used for the other feasibility outcomes: completion of baseline survey, consent to follow-

up survey and completion of follow-up survey rates. Time taken for each completed survey was rounded to the nearest minute and averaged within the two groups to estimate the completion time of each group. The proportion of clients who selected 'Yes' for each item of acceptability was also compared between conditions. All statistical analyses were conducted using SAS version 9.4 (SAS Institute, Cary, NC) and Stata V14 (Statacorp, College Station, TX). Statistical significance was $p<0.05$ for all tests.

3. Results

Five log sheets were missing for the computer tablet condition, for reasons unknown. For days where the log sheets were missing, a clinical record check was performed and all potentially eligible clients were counted as non-consenters. This provides a conservative estimate of consent on missing log sheet days as it is unknown whether these clients were approached. Nine participants were recruited to the computer tablet condition across these days. The clinical record check revealed 13 potentially eligible clients across the five days. These clients were included in the final number approached. Therefore, a total of 113 clients were approached for the study from September 2015 to April 2016, of which four were ineligible (see Figure 1). Of the remaining 109 participants, 69 (63.3%) consented to the study. Potential participants in the telephone condition were called an average of 2.7 times (range: 1-7). Sixteen call backs were requested, of which 1 decided not to consent, 4 were not able to be reached on follow-up attempts and 11 completed the interview. For both conditions at the 3-month follow-up, an average of 2.8 calls were made to each participant (range: 1-8).

3.1 Sample characteristics. Table 1 shows participants' characteristics by condition. Gender was available for all consenters and non-consenters while age was missing for four non-consenters. When comparing the age and gender of consenters vs non-consenters, no statistical differences were found (age: $t(102)=0.14$, $p=0.89$; gender: $\chi 2(1)=2.2101$,

p=0.1371). Additionally, there were no differences between those approached for each condition by age ($t(102)=0.47$, $p=0.6405$) or gender ($\chi 2(1)=1.6793$, $p=0.195$).

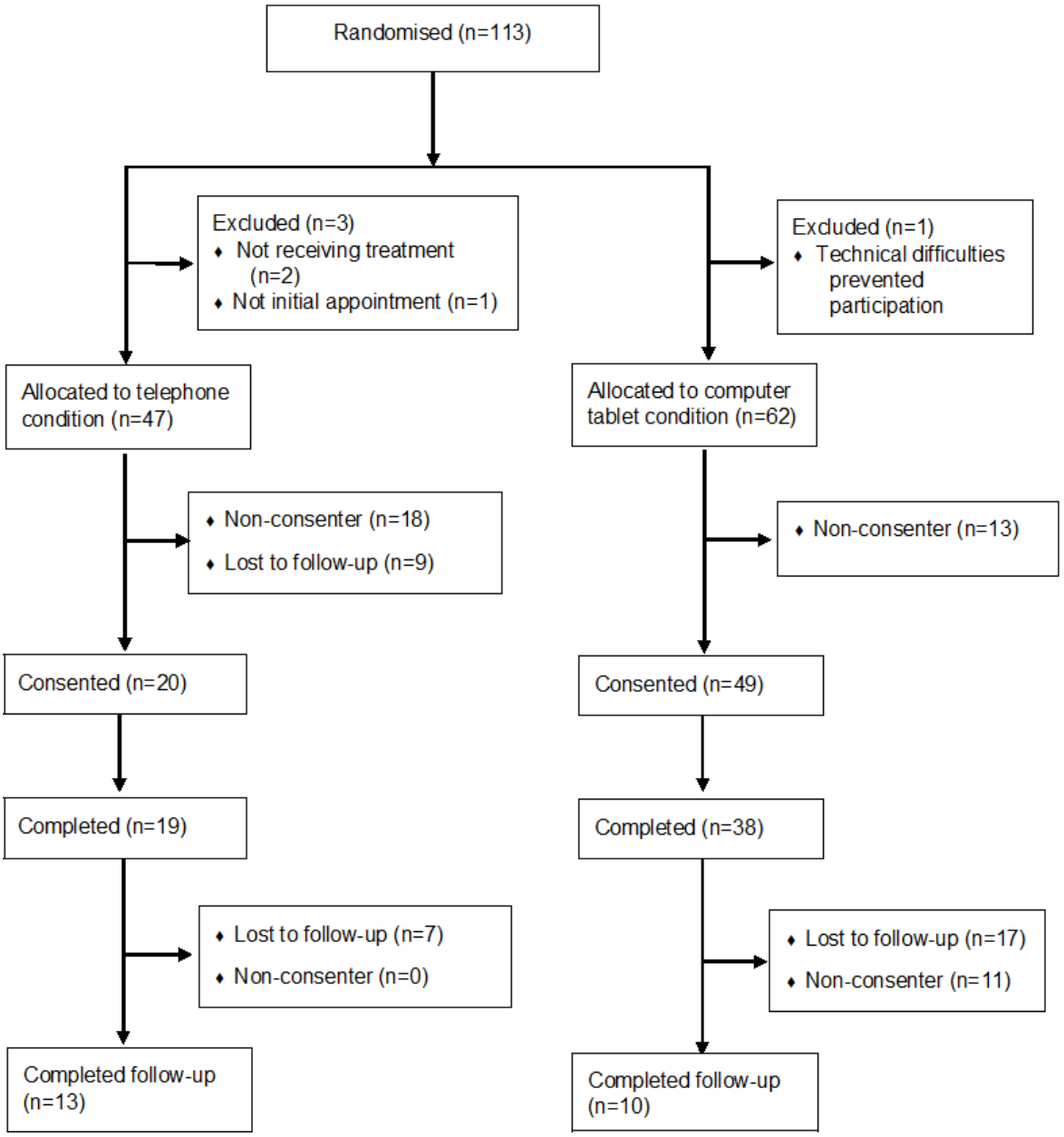

Figure 1. *Flowchart of study recruitment. Percentages were calculated using each stage of consent as the denominator to highlight retainment rates throughout the study.*

Table 1. Client characteristics

Variable	**Subgroup**	**Computer Tablet N (%)**	**Telephone N (%)**
Age	-	M=41.71 (SD=15.06)	M=45.3 (SD=12.52)
Gender	Female	25 (51.0%)	10 (50.0%)
Aboriginal or Torres Strait Islander status	No	38 (77.6%)	18 (90.0%)
	Aboriginal	2 (4.1%)	2 (10.0%)
	Missing	9 (18.4%)	0 (0.0%)
Education level	Primary school	0 (0.0%)	1 (5.0%)
	High school	13 (26.5%)	7 (35.0%)
	Trade or vocational training	20 (40.8%)	9 (45.0%)
	University degree	7 (14.3%)	3 (15.0%)
	Missing	9 (18.4%)	0 (0.0%)
Current employment	Full-time work	10 (20.4%)	4 (20.0%)
	Part-time or casual work	5 (10.2%)	0 (0.0%)
	Home duties	2 (4.1%)	1 (5.0%)
	Unemployed	12 (24.5%)	7 (35.0%)
	Retired	5 (10.2%)	2 (10.0%)
	Disability pension	3 (6.1%)	4 (20.0%)
	Other	3 (6.1%)	2 (10.0%)
	Missing	9 (18.4%)	0 (0.0%)
Insurance coverage	Yes	13 (26.5%)	4 (20.0%)
	No	27 (55.1%)	16 (80.0%)

	Missing	9 (18.4%)	0 (0.0%)
Possession of a concession card	Yes	22 (44.9%)	12 (60.0%)
	No	18 (36.7%)	8 (40.0%)
	Missing	9 (18.4%)	0 (0.0%)
Marital status	Married or living with partner	13 (26.5%)	9 (45.0%)
	Divorced or separated	13 (26.5%)	2 (10.0%)
	Widowed	0 (0.0%)	0 (0.0%)
	Never married	14 (28.6%)	9 (45.0%)
	Missing	9 (18.4%)	0 (0.0%)
Lives with*	Spouse or partner and/or child(ren)	15 (30.6%)	10 (50.0%)
	Other family members	9 (18.4%)	2 (10.0%)
	On my own	13 (26.5%)	5 (25.0%)
	Unrelated flatmate or co-tenant	2 (4.1%)	1 (5.0%)
	Other	1 (2.0%)	3 (15.0%)
	Missing	9 (18.4%)	0 (0.0%)
Main treatment seeking substance	Alcohol	31 (63.3%)	15 (75%)
	Cannabis	7 (14.3%)	1 (5.0%)
	Amphetamines	0 (0.0%)	1 (5.0%)
	Nicotine	1 (2.0%)	1 (5.0%)
	Heroin	0 (0.0%)	1 (5.0%)
	Methamphetamines	5 (10.2%)	0 (0.0%)
	Other	3 (6.1%)	1 (5.0%)
	Missing	2 (4.1%)	0 (0.0%)

Past treatments	Yes, 1 past treatment	4 (8.2%)	5 (25.0%)
	Yes, 2-3 past treatments	5 (10.2%)	5 (25.0%)
	Yes, 4-5 past treatments	3 (6.1%)	0 (0.0%)
	Yes, >5 past treatments	3 (6.1%)	2 (10.0%)
	No	24 (49.0%)	8 (40.0%)
	Missing	10 (20.4%)	0 (0.0%)

**Percentages may be greater than 100% as 'Lives with' question allowed multiple responses.*

3.2 Feasibility. Participant consent and completion rates for the baseline and follow-up surveys are provided in Table 2. The percentages in Table 2 are based on the proportion of the total number of eligible participants approached for each condition. Participants in the computer tablet condition had a consent rate 36.5% higher than the telephone condition (p<0.0001; 95% CI=19.5, 53.4). The computer tablet condition also had a 20.9% higher completion rate than the telephone condition for the baseline survey (p=0.025; 95% CI=26.6, 39.1). There was no difference in the proportion of consent to follow-up (p=0.905; 95% CI=-15.3, 17.3) or follow-up survey completion rates (p=0.142; 95% CI=-26.9, 3.8) between the two groups. The computer tablet and telephone baseline surveys took an average of 11 and 17 minutes to complete, respectively.

Table 2*. Consent and completion rates for the computer tablet and telephone conditions*

Feasibility	**Computer tablet, N=62**	**Telephone, N=47**	**Difference in Proportions [95% CI]**	**P-value**
Consent for baseline survey	79.0% (n=49)	42.6% (n=20)	36.5% [19.5, 53.4]	<0.0001
Completion of baseline survey	61.3% (n=38)	40.4% (n=19)	20.9% [26.6, 39.1]	0.025
Consent to follow-up	43.6% (n=27)	42.6% (n=20)	1.0% [-15.3, 17.3]	0.905
Completion of follow-up	16.1% (n=10)	27.7% (n=13)	-11.5% [-26.9, 3.8]	0.142

Note: Percentages have been rounded to one decimal places which has caused small inconsistencies in the table.

3.3 Acceptability. Table 3 contains acceptability data for both conditions. Statistical comparison between groups was unwarranted due to high rates of acceptability in both groups. For the computer tablet specific questions, 92% (n=35) of participants reported it was easy to use and 100% (n=38) indicated that the computer tablet allowed enough privacy. When asked if they would complete a similar computer tablet survey in the future, 87% (n=33) participants indicated "Yes" and 13% (n=5) indicated "Unsure". However, of those who indicated "Yes", and "Unsure" only 73% (n=24) and 40% (n=2) consented to the follow-up telephone survey, respectively. Of those completing the survey via telephone interview, 100% (n=20) reported that the questions were easy to understand and that they had enough time to complete the questions while 95% (n=19) reported the instructions were easy to follow and that they felt comfortable answering all the questions. All of the participants who completed the telephone survey consented to the follow-up telephone survey (n=20).

Table 3. *Acceptability of computer tablet data collection and telephone data collection*

	Computer tablet	**Telephone**
Acceptability	***Yes***	***Yes***
Instructions were easy to follow	100% (n=38)	95% (n=19)
Questions were easy to understand	97% (n=37)	100% (n=20)
Enough time to complete questions	100% (n=38)	100% (n=20)
Felt comfortable answering questions	92% (n=35)	95% (n=19)
Computer tablet was easy to use	92% (n=35)	NA
Computer tablet allowed enough privacy	100% (n=38)	NA

3.4 Cost. The costs associated with the computer tablet condition included: two computer tablets costing AUD$599 (iPad air 2); a 4G wireless internet device to connect to both the computer tablets costing AUD$99; and data for the internet device costing AUD$50 for 5GB, lasting 12-months. An estimated 42 hours work by a research assistant and computer programmer on an equivalent rate of AUD$48.99 per hour (including 31% on-costs) was required to program the survey, totalling AUD$2,057.58. Computer tablet surveys were self-administered with automated data entry so had no cost associated with administration or data entry. Therefore, the total cost of administering the computer tablet survey was AUD$3,404.58 or AUD$69.48 per participant recruited to the study or AUD$89.59 per completed survey.

The costs associated with the telephone condition included printing the consent for contact forms (1 page) and a copy of the survey (10 pages). At AUD$0.11 per printed page or $1.21 per client consenting to contact (n=35), a total of AUD$42.35 was used for printing costs. It also included 85 phone calls made to the 32 eligible participants (M=2.7, range=1-7) at a rate of $0.40 per phone call, totalling $34. The survey administration and data entry was conducted by a trained research assistant with a pay rate of AUD$48.99 per hour (including 31% on-costs). The total interview time for the 20 surveys was 340 minutes (M=17 minutes, range=10-28 minutes) and 80 minutes for data entry (approximately 4 minutes per survey), totalling AUD$342.93. The cost for the telephone condition was AUD$419.28 or AUD$20.96 per participant recruited to the study or $22.07 per completed survey. The computer tablet condition would have had little to no ongoing costs and therefore the overall cost would remain the same for studies with larger sample sizes, consequently reducing the rate per participant for the computer tablet. Conversely, the cost for the telephone condition would remain the same per participant and therefore the overall cost would continue to increase with larger sample sizes. For this study, based on cost per completed survey, a

sample size of 155 would see the computer tablet become more economical than the telephone condition.

4. Discussion

This study examined the feasibility, acceptability and cost of an in-clinic computer tablet survey versus post-clinic telephone data collection in an outpatient AOD treatment clinic. The computer tablet condition had a significantly higher consent rate than the telephone condition indicating a more feasible method of data collection among AOD outpatients. There are several features of the computer tablet condition which may explain this finding. The immediacy and convenience of the in-clinic computer tablet condition is highly likely to have contributed to the higher consent rate. Additionally, completing a survey independently on a computer tablet provides privacy and allows participants to provide responses without fear of stigmatisation, which has been found to be a common concern[20,21]. The lower consent rate in the telephone condition may have been impacted by clients' reluctance to discuss the sensitive topic of addiction with a researcher or instability in clients' home lives [22]. The two-step consent procedure in the telephone condition may have been another contributor to the difference consent rates. This method has previously shown to yield low consent rates among cancer patients[23].

The overall proportion of completed surveys was significantly higher for the computer tablet condition at baseline. However, the proportion of completed surveys among individuals that consented was higher in the telephone condition. This finding aligns with previous research demonstrating greater data completeness for telephone interviews[14]. Nonetheless, the higher number of participants in the computer tablet condition is likely to produce data with greater generalisability. Programming forced question responses or having a researcher in the clinic may assist with data completeness for computer surveys. Participants being called for their

appointments before completing the survey is another reason for incompletion. This is difficult to overcome for point of care data collection[24], however, ensuring surveys are concise may assist with this. Having a researcher present could also increase consent rates for data collection via telephone through ensuring adequate explanation of the study but this would incur greater costs and be time intensive for researchers.

The significantly higher consent and completion rates in the computer tablet condition at baseline was lost at follow-up with no significant differences between the two conditions. Telephone data collection at follow-up cancelled out any effects observed between groups at baseline, further illustrating the infeasibility of telephone data collection. Reimbursements or incentives may increase participation and retainment among this populations[25,26], though ethical considerations surrounding the coercive nature of payments needs to be carefully considered for this vulnerable population group.

The self-reported acceptability was high in both conditions. Considering this, a better indicator of acceptability is greater uptake of the computer tablet survey compared to a telephone interview. The low consent rates for the telephone condition indicate that while those who participated in the telephone interviews found this method acceptable, a large portion of the clients were not comfortable with this method.

Overall costs were much higher in the computer tablet condition. Future researchers should consider sample size when determining the most cost effective method of recruitment. The current study indicates for sample of 155 participants, the computer tablet becomes more affordable per completed participant than the telephone interview. Researchers aiming to recruit a larger sample size should consider a computer-administered mode of data collection for a more cost efficient method. Smaller studies could consider utilising telephone interviews to reduce cost but may also need to consider the likelihood of low consent rates.

4.1 Limitations

While the study was adequately powered, it was conducted at a single AOD outpatient clinic, a larger sample from multiple sites would improve generalisability. The missing log sheets in the computer tablet condition may have influenced consent rates for the computer tablet condition. However, accessing clinical records and including all potentially eligible clients on these days is likely to generate a conservative estimate of consent as not all of these clients may have been approached. The findings of this study would not have altered if differences in consent rates between the two conditions are greater than reported here. Clinic staff may have impacted consent rates in the telephone condition in the way they provided information about the study, whereby clients may have felt uncomfortable in providing telephone contact details. However, given that the consent rates for follow-up by telephone were low across both conditions, it is more likely that the results reflect lower acceptability of the telephone mode of administration among this group rather than recruitment bias. Additionally, participants in each of the study conditions were not asked about their preference in completing the survey via computer tablet or telephone. This information could have provided insight into whether consent was dependent upon study method. Finally, the cost analysis conducted is specific to the methods employed by the researchers in this study. As there are various ways to set up survey administration by computer or telephone, the costs presented here will not necessarily coincide with costs utilising different methods of administration.

4.2 Future research

Future researchers could explore strategies to increase consent rates for telephone interviews and to increase completion for computer-administered surveys. Future researchers could examine data quality using computer and telephone data collection in a AOD setting as a

previous study comparing these two methods among college women found some differences in alcohol related outcomes[15]. Of particular interest would be to examine computer versus telephone methods for collecting substance use data via daily diary methods, particularly given the focus on ecologically valid assessments for substance use outcomes[27].

4.3 Conclusion

While the requirements of each research study need to be carefully considered, computer tablet data collection yielded higher baseline survey consent and completion rates, and therefore is the preferred method of data collection for cross-sectional research in outpatient AOD clinics. Where telephone data collection is necessary, methods to increase participation rates need to be considered and implemented prior to recruitment.

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