Title:
Levels and Predictors of Patient Satisfaction with Doctor Home-Visit Services in Australia

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ABSTRACT
**Objective:** This study aims to assess patient satisfaction with Australian after-hours house-call (AHHC) services and its predictors, with the hope of improving quality and patient outcomes. The findings might also have international relevance, given the developing nature of the AHHC in most countries.

**Methods:** A cross-sectional survey of all 10,838 patients known to have patronized the AHHC service in Australia over a one-week period. The main Outcome Measure was the Patient Satisfaction Questionnaire 18 (PSQ-18).

**Results:** A total of 1,228 questionnaires were returned. General Satisfaction (GS) level was found to be 85.2% (Mean 4.16/5). Other Scales of Satisfaction, in decreasing order, were “Financial Aspects, FA” (87.4%; 4.36/5), “Communication, CM” (87.3%; 4.18), “Technical Quality, TA” (82.1%; 4.09), “Time Spent with Doctor, TSD” (77.7%; 3.91) “Interpersonal Manner, IM” (75.7%; 3.87) and “Accessibility and Convenience, A&C” (72.9%; 3.82).

The major predictor of increased satisfaction was the time it took the doctor to arrive, with increased satisfaction on GS (T<4hours; p<0.01), IM (T<30minutes; p=0.03), FA (T<2hours; p=0.01), TSD (T<2hours; p<0.01), and A&C (T<4hours; p<0.01). Other positive predictors of aspects of satisfaction included “being a student”, “age of patient<=16”, and “being Australian-born”, while “being on a pension” was negatively associated with Communication (p=0.03). No associations were found with Gender, Marital Status, Employment Status, Family Income or Having Children in the Household.

**Conclusions:** This study concludes that satisfaction in Australian AHHC is high on all scales, but recommends that the service providers should aim to attend to patients within four hours of their initial calls.

**Keywords:** after-hours, patients, satisfaction, general practitioners, deputizing services, house calls
Consumer satisfaction has been identified as an important issue in the evaluation and the shaping of health care, even though the exact aspects of healthcare related to it are rarely addressed at primary care levels. Patient satisfaction is one indicator of quality in healthcare and its assessment can be undertaken by considering users’ experiences of healthcare services.

After-hours house-call (AHHC) services are currently growing rapidly in Australia. They provide services through contracted medical practitioners who work solely during after-hour periods. Patients usually contact the call centres of the respective AHHC companies, which take the relevant details, book the calls and then dispatch a doctor to the patient’s house or preferred location. In 2013, the AHHC services attended to about 1.51 million patients, representing nearly 38% of all ‘urgent’ after-hours presentations to care. Information available on the website of the National Association of Medical Deputising Services (NAMDS) indicate that the AHHC services are available to about 17.5 million (72.6%) of Australia’s 24.1 million population as at December 2015, including metropolitan areas in all of the country’s States and Territories, with the exception of the Northern Territory.

Despite this growing popularity, no previous study of patient satisfaction with Australian AHHC has been undertaken, even though low-level satisfaction with waiting times has been reported in an official report that reviewed after-hour models of care in the country. Recent publications have explored satisfaction and burnout among doctors involved in Australian AHHC, but these provide little insight into patients’ views on the services, as it is recognised that medical practitioners are poor predictors of the levels of satisfaction of their patients. A direct assessment of the patients is, therefore, necessary to measure their satisfaction with services and thus gain an understanding of one aspect of service quality.

Apart from measuring satisfaction, this study also explores the determinants and patient-characteristics that significantly predict satisfaction with the service. Recommendations from these findings are intended to improve the overall quality of AHHC in Australia. The findings may also be of international relevance, given that various countries around the world, including the United Kingdom, France, Canada, and the Netherlands, are at different levels of development of their AHHC industry, and might find the results from this study useful as they review their own systems.
Our study focuses only on dedicated AHHC services. However, it should be noted that a small number regular-hours general practices and co-operatives also provide home visiting services in Australia. In addition to these services, after-hours medical services in Australia can also be provided through other service models that do not involve home visits, including office-based services, emergency departments, telephone triage services, web-based services, among others.

**METHODS**

**Setting and Participants**

Through collaboration with Australian providers of dedicated AHHC, all of whom were members of the National Association of Medical Deputising Services (NAMDS), all non-institutionalised patients who sought assistance from their services in the week from January 25th to 31st, 2016 were invited to participate. Patients residing in Aged Care Facilities were excluded. In the case of children and patients with severe disabilities, the questionnaires were completed by a parent, guardian or other responsible adult in the households who had either witnessed the consultation, or were able to confer with the primary patients. Where more than one person was seen in a household on the same day or on multiple occasions within the one week study period, respondents were asked to respond in relation to the ‘main’ patient attended to during the consultation(s).

For the purposes of the study, AHHC was defined as house visits by doctors at any time from 6pm to 8am on weekdays, from 12 noon on Saturdays, and all-day Sundays and public holidays.

**Questionnaire design, dispatch and follow-up**

The main Outcome Measure was the validated, 18-item Patient Satisfaction Questionnaire (PSQ-18) with some slight modifications to make the wordings applicable to AHHC. The Esurv tool was used for the questionnaire design. Given the slight modification and additional questions, the final questionnaire was piloted using...
20 patients who did not patronize AHHC at the time of the survey, with their recommendations incorporated to produce the final four-paged document (Supplementary Data Table S1).

To ensure that all patient categories were reached, a combination of both postal and online questionnaires was utilized, and to guarantee patient confidentiality, the questionnaires were distributed by the AHHC companies themselves, without the involvement of the researchers. These distributions were done either directly (as in the case of the online questionnaires, where the questionnaires were delivered as links contained in emails sent to the patients), or in conjunction with the Griffith University Printing Press for the postal versions (for the printing, packaging, confidential addressing and posting of the relevant documents without the involvement of the research team). The AHHC companies included cover notes as they deemed necessary, in addition to the cover letters from the researchers, which were attached to the questionnaires (Supplementary Data Table S1).

Online forms were returned electronically to the researchers by clicking the ‘submit’ link at the end of each questionnaire, while the postal versions were returned directly to the research team through enclosed, postage-paid, return envelopes. Returned forms did not include identifying information about the respondent beyond the demographic data reported below.

To optimize recall on the part of the respondents and limit the possibility of re-use of the service after the study week but before the questionnaires were completed, the online version was dispatched (to patients with a recorded email address) within 24 hours after the end of the week, while the postal questionnaires were sent to the remainder of the patients within eight days.

Overall, a total of 10,838 patients (3,817 online and 7,021 by post) were successfully recruited for the study. In order to evaluate usual AHHC care, it was agreed with the AHHC companies that the doctors involved in the service should not be informed that the study was being undertaken and this plan was approved by the Human Research Ethics Committee (see ethical clearance below).

We did not utilize follow up reminders for two reasons. Firstly, because AHHC services were ongoing, some of the respondents would have been likely to have re-used the service by the time reminders were sent, which might have
influenced responses. Secondly, given that time would have elapsed between the initial use of the AHHC and the time the reminders reach the respondents, recall bias might have occurred and significantly affected data quality.\textsuperscript{22} On the other hand, the absence of reminders might have reduced response rates and threatened generalisability. For this reason, we estimated the required sample size in advance.

**Sample size estimation**

To calculate the minimum number of responses required to sample the population of people using AHHC adequately (and therefore allow generalization of findings), a prior estimation was done based on a previous study,\textsuperscript{23} which found that 61.8\% of patients seen by various out-of-hours services (including AHHC) were satisfied. With a population size of 10,838 in this study, and allowing for an error margin of 5\% with a 95\% confidence interval (CI), this analysis predicted a minimum required number of responses of 357. The data used for this sample size estimation came from a 2003 systematic review of published papers because no more recent data from an after-hours home-visit service were available. This highlights the paucity of work in this area, and further justifies the need for us to undertake this study.

**Statistical analysis**

All analyses were performed using SPSS version 22.0. By following the prescribed guide for the analysis of the PSQ-18 (Supplementary Data Table S2), seven different Scales of Satisfaction (dependent variables) were derived from the original results as follows: General Satisfaction, Technical Quality, Interpersonal Manner, Communication, Financial Aspects, Time Spent with the Doctor, and Accessibility and Convenience. The levels of satisfaction for the respective scales were presented both as percentages (satisfied or very satisfied) and as mean ratings (out of five).

Ordinal Logistic Regression (OLR) was used to explore significant predictors of satisfaction from multiple independent explanatory respondent characteristics. These respondent variables were dichotomized where necessary, and all variables explored are summarized in Table 1. A univariate OLR analysis was first performed for all these independent variables, and only those found to be statistically significant were included in the final multivariate OLR analysis. For each comparison, an odds ratio (OR) was generated, along with its corresponding 95\% confidence interval (CI), with a significance level (p value) set at <0.05.
**Ethical Considerations:** Participation in the survey was voluntary, and consent was included in the questionnaire (Supplementary Data Table S1). Responses were provided anonymously. Ethical Approval was obtained from the Griffith University Human Research Ethics Committee, HREC (reference number 2015/854).

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**RESULTS**

**Basic response characteristics**

1,228 of the 10,838 questionnaires were returned, representing an 11.3% response rate (586/3,817 [15.4%] online and 642/7,021 [9.1%] postal), which was well above the required response rate estimated *a priori*. All the basic characteristics of the respondents are summarized in Table 2.

**Satisfaction Levels: Items and Scales (Tables 3 & 4)**

Table 3 summarizes the responses for all 18 items of the PSQ-18 used for the survey. It shows that the lowest satisfaction level of 57.7% (mean of 3.33/5) was recorded on Item 9 (waiting for too long for doctor to arrive), while the highest level of 90.7% (mean of 4.41/5) was for Item 5 (not being set back financially).

The Seven Scales of Satisfaction derived from the raw items are shown in Table 4. In decreasing order, the levels of satisfaction found are as follows: Financial Aspects (87.4%; Mean 4.36/5), Communication (87.3%; 4.18), General Satisfaction (85.2%; 4.16), Technical Quality (82.1%; 4.09), Time Spent with Doctor (77.7%; 3.91), Interpersonal Manner (75.7%; 3.87), and Accessibility and Convenience (72.9%; 3.82).

**Associations of satisfaction scales with independent patient-variables (Table 5):**

With respect to General Satisfaction, we found that patients seen within 4 hours of their initial phone call were more likely to be satisfied (OR = 1.71; CI 1.22 to 2.40), while households where patients aged 16 or less were seen also reported higher satisfaction (OR = 1.42; CI 1.11 to 1.81). Similarly, on the Technical Quality, households where patients aged 16 or less were seen reported greater satisfaction (OR = 1.36; CI 1.09 to 1.69).
Regarding Interpersonal Manner, both the patients seen within 30 minutes of their calls (OR = 1.51; CI 1.03 to 2.22) and those who were Australian-born (OR = 1.43; CI 1.09 to 1.89) were all likely to report satisfaction with AHHC. In contrast, patients on any form of pension or benefit reported less satisfaction with Communication (OR = 0.75; CI 0.58 to 0.97).

We also found that patients who identified as students (OR = 1.45; CI 1.09 to 1.91), as well as those seen within two hours of their original calls (OR = 1.35; CI 1.06 to 1.71) both reported higher satisfaction with the Financial Aspects of the services.

Patients seen within two hours of their calls also reported significant satisfaction regarding Time Spent with the Doctor (OR = 1.51; CI 1.18 to 2.01), while those seen within four hours reported same with the Access and Convenience aspects of the service (OR = 4.54; CI 3.16 to 6.52).

None of the following respondent variables was found to be a significant predictor of satisfaction on any of the seven scales: gender, marital status, having children in a household (in which an adult was seen), employment status, family income, and whether first-time or multiple users of the AHHC.

**DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS**

Analysis of the demographics of our respondents shows that, compared to data from 2015, the age groups of ‘under 16’ and ‘65 and over’ were overrepresented in our survey compared to the general Australian population (30.7% compared with 18.8% for ‘under 16s’; 26.5% compared with 15.0% for the ‘65s and over’). These findings align with a publication that cited Medicare claims data, which reported that these two age groups generally rely more on AHHC than other age groups. A comparison by gender also shows that our female to male ratio of 59.9% to 39.9% is higher than the ratio in the general population, where both gender are almost evenly split (100 females to 99 males). On the surface, this would indicate that a higher proportion of females utilise the AHHC services than males, but it is not clear why this would be the case as our study was not designed to answer this question.

Based on the reasonably high levels of patient satisfaction on all seven scales (range of 72.9% to 87.4%; Table 4), one can conclude that Australians are generally satisfied with AHHC. This is a commendable finding, and an argument can be
made between this and the report of a recent publication,\textsuperscript{25} which found that about two-thirds of Australian AHHC practitioners feel well supported clinically and professionally. Such a reasonably decent level of support for doctors can be expected to translate to some good quality care, which can in turn result to a high level of satisfaction among the patients they treat.

We note, however, that more insight into the various aspects of satisfaction with AHHC can be gained when the raw data from the PSQ 18 is analysed (Table3). Even though the PSQ is designed to be analysed on the basis of the seven scales (and not the eighteen items), these individual items will be highlighted where the findings are deemed significant.

On analysing the satisfaction levels of the various scales (Table 4), it is not surprising that patient satisfaction with the financial aspects of AHHC is ranked the highest, given that the service in Australia is almost universally ‘bulk-billed’; a term which means patients bear no direct costs under the government-sponsored Medicare program. The basis of this finding lie in the fact that about 90% of the respondents agreed that they were not set back financially by using the service, while about 84% disagreed with the notion that they might have paid for more medical care than they might have afforded (Table 3).

It is pleasing to find a high level of satisfaction on the communication aspects of AHHC (Communication scale: 87.3%; 4.18/5), given that published studies\textsuperscript{26-28}, including a systematic review,\textsuperscript{29} have established the positive relationship between communication and patient satisfaction.

The only comparable Australian general practice survey\textsuperscript{3} to our findings focused on satisfaction among patients who utilized regular-hours, practice-based services. Patients in our study appeared to be more satisfied than practice-based patients (85.2% ‘satisfied’ or ‘very satisfied’ on the General Satisfaction scale, compared with 68.6%), but this comparison should be treated with caution since the two studies utilised different instruments (the practice-based study used the General Practice Assessment Questionnaire, while we used the PSQ-18). Not surprisingly, even though Accessibility and Convenience was the lowest scoring scale in each study, the level among AHHC patients was higher than in practice-based patients (72.9% vs. 68.6%), given that AHHC is delivered in patients’ own homes.
A number of overseas out-of-hours (OOH) surveys are available for comparison, though some of these were not limited to AHHC, but also included office-based and telephone consultations. A 2003 systematic review of different models of OOH, found that 61.8% of patients seen by deputising AHHC doctors reported General Satisfaction with the care they received, compared to 85.2% on the same scale in this study. The General Satisfaction level from our study is also higher than the 66.2% reported in a 2013-14 national survey of general practice patients seen by OOH services in England, while its mean of 4.16 is substantially higher than the 3.29 reported for home-visit OOH services by a London-based GP co-operative. The General Satisfaction scale result in our study also compares well with findings from a North London study, which reported a level of 71% in relation to the AHHC component of their survey. The General Satisfaction level from our study, however, is within the 79% to 88% levels reported by various studies of OOH patients in the Netherlands, and less than the 88% reported for a mix of OOH services in the West of Ireland.

It is worth pointing out that, on the raw data shown in Table 3, we observed the lowest satisfaction mean of 3.33 (out of 5) on Item 9 of the PSQ18 (waiting for too long before the doctor arrived). This is very much in line with a 2012 report cited in a recent review of after-hours service models in Australia, which stated that satisfaction with AHHC in Australia is low with waiting times.

In our OLR (Table 5), five predictors were associated with at least one Scale of Satisfaction in AHHC. These include ‘time it took doctor to arrive’, ‘student status’, ‘age’, ‘pension status’, and ‘being Australian-born’. Of these, the ‘time it took doctor to arrive’ was the strongest predictor of satisfaction.

Arriving quickly to see the patient was positively associated with five out of the seven Scales of Satisfaction. Specifically, arriving within four hours of the patient’s call increased General Satisfaction by over one-half-times, while it increased satisfaction with Accessibility and Convenience by about four-and-half times. Similarly, patients seen within two hours of their calls report higher satisfaction with Financial Aspects and Time Spent with Doctor, while those seen within half an hour are more satisfied with the Interpersonal Manner aspects of the AHHC. Our finding that “time to being seen” was related to multiple aspects of satisfaction resonates with a wide range of studies where long waiting times are associated with low satisfaction among patients. Arguably, doctors are likely to be at their best (with less fatigue and more enthusiasm) within the first few hours of starting an AHHC shift, and might therefore be more likely to satisfy
the patients on all the identified aspects. It should be noted though, that even though majority (87.3%) of the patients surveyed were attended to within four hours of their calls, only just over half (53.2%) were seen within two hours (Table 2). Given the major impact of timeliness on patient satisfaction in AHHC, more attention may need to be paid by AHHC service providers towards improving this parameter.

“Being a Student” was another predictor of satisfaction with AHHC services. As shown in Table 5, it was positively associated with satisfaction on the Financial Aspect scale. No previous published study has looked at this patient-variable as a predictor of satisfaction in AHHC, though an Irish practice-based study found that patients who had completed primary school tend to be more satisfied. It may be that the fact that AHHC is provided without cost to the patient in Australia and the constrained financial circumstances of many students account for our finding that students reported higher satisfaction (nearly one-and-half times) with the financial aspects of this service.

It is not clear why patients on pension or other forms of benefits reported less satisfaction with the Communication aspect of AHHC services and future studies may be helpful in exploring this, particularly with respect to the types of pensions the respondents were on (which was not explored in this study), as this might give an insight into this finding. In any case, given that this category of patients are often of low socioeconomic status, it may be worth mentioning that this finding seems to disagree with the report that it is patients of higher socioeconomic status that were likely to be less satisfied with OOH in Ireland.

The fact that patients who were Australian-born reported more satisfaction with the Interpersonal Manner aspects of the AHHC is broadly consistent with reports of OOH from the UK, which found that non-whites where less satisfied with interpersonal aspects of care in OOH, even though studies elsewhere reported no difference in ethnicity. There is a possibility that early childhood cultural differences might be a factor here. Unfortunately, our study did not collect
data on ethnicity, so this comparison should be treated with some caution, since some Australian-born patients are non-white.

Analysis of our findings with age reveals a few surprises. For instance, the findings of higher satisfaction on General Satisfaction and Technical Quality from respondents where patients aged 16 or less were seen differs from reports of other studies,\textsuperscript{17,32,36} which generally found that low satisfaction were reported by patients seeking help for children. Even though the reason for this discrepancy is not clear, it should be noted that our finding agrees with the report\textsuperscript{41} that AHHC services are more beneficial to the vulnerable age groups, which includes children. The other surprise is the non-significant association between any aspect of satisfaction and age of \textgreater{}65 years, given that multiple studies\textsuperscript{23,32,36,38} have established that being elderly is generally associated with increased satisfaction with OOH services. The reason for this may be related to the fact that this study looked at the elderly (65 or older) and not the very elderly (85 or more), and one report\textsuperscript{6} suggests that the benefits of AHHC are associated with the latter age group.

It is interesting to note that that the patients’ gender, marital status, having children in a household, employment status, and family income have no impact on satisfaction with AHHC in Australia. The non-association with gender disagrees with a finding\textsuperscript{9} that higher satisfaction is linked to being male, even though it agrees with reports in the majority of published literature\textsuperscript{19,36,40}. No studies on OOH could be found to allow comparisons on the findings on non-associations with that marital status, employment, family income and patients living with children.

**Study Limitations:**

The inability of the study to identify the health conditions the patients had, and see how the seriousness impacted on their satisfaction is considered a limitation, given that it has been suggested that patients’ health statuses may have an impact on their satisfaction level.\textsuperscript{19} Another limitation is in the relatively low response rate of our survey. This is partly due to the lack of follow up, which was deliberate in order to avoid other biases. However, given that the number of responses exceeded the estimated sample size, this potential limitation is arguably of limited effect and the findings are
still statistically generalizable. We also observed the limitation that arose on the estimation of our sample size due to limited literature in this subject. However, we believe that the number of responses received was large enough to surmount any possible effect this might have had. Finally, we acknowledge that our survey only covered the proportion of after-hours home visits carried out by dedicated AHHC services in Australia. As stated in the introduction, some general practices and co-operatives also provide home-visit services and our findings cannot be generalized to them. However, according to data from 2013, these other providers of AHHC accounted for only 12.2% of such visits.9

Conclusions

Satisfaction in Australian AHHC is comparably high on all scales, especially on Financial Aspects, with lower satisfaction in relation to Access and Convenience, most likely related to delay in reaching patients. We also conclude that reaching patients quickly appears to be the most significant predictor of satisfaction in AHHC, but other positive predictors include age of 16 or less, being a student, and being Australian-born, while being on pension is a negative predictor. Australian patients’ gender, marital status, employment status, family income and having children in a household where an adult is seen, all have no impact on satisfaction.

Cost: No external financial support was received for the study.

CONFLICTS OF INTEREST: None.

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