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Development and Initial Psychometric Evaluation of the Patient Perspective of Arrhythmia Questionnaire

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Abstract

There are no disease-specific questionnaires to measure patient sensitive outcomes in arrhythmia patients. We report the development and preliminary psychometric testing of the Patient Perception of Arrhythmia Questionnaire (PPAQ). The PPAQ was developed using formative research, exploratory factor analysis, expert review, pilot study, and regression. The PPAQ measures frequency and duration of episodes, symptoms, impact on daily activities, and restricted activity days. After preliminary content validation, the responsiveness of the PPAQ was tested in 103 arrhythmia patients. The measures showed good sensitivity and reliability. Preliminary construct validation was supported by significant differences ($p < .001$) among groups of arrhythmia patients consistent with clinical patterns. Preliminary evidence from patients with supraventricular arrhythmias suggests that the questionnaire has acceptable psychometrics and could be useful in future studies of arrhythmia patients.

Keywords

Symptoms; Supraventricular Tachycardia; Arrhythmias; Measurement; Women's Health

Supraventricular tachyarrhythmia (SVT) is a broad term referring to a variety of fast heart arrhythmias originating from the atria or atrioventricular junctional tissue (Blomstrom-Lundqvist et al., 2003; Medi, Kalman, & Freedman, 2009). SVTs are relatively common rhythm disorders, with an estimated prevalence of 570,000 cases in the United States and an incidence of approximately 89,000 new cases per year (Orejarena et al., 1998). These regular, rapid arrhythmias typically have an abrupt onset and termination and recur sporadically, at random. The vast majority of SVT patients are healthy, young adults with no underlying cardiac or associated comorbid conditions.

Findings from retrospective quantitative and qualitative research on the symptom experience of persons living with SVT suggest that episodes of SVT negatively affect patients in many areas of daily life (Walfridsson & Walfridsson, 2005; Wood, Wiener, & Kayser-Jones, 2007). Radiofrequency catheter ablation offers a cost effective, curative treatment for most SVTs (Blomstrom-Lundqvist et al.; Medi et al.). Referral to an arrhythmia specialist for ablation often does not occur, however, because of misdiagnosis of patient symptoms (Dagres, Clague, Breithardt, & Borggreffe, 2003; Lessmeier et al., 1997; Wood et al., 2007).

The physical symptoms of SVT are thought to be well understood by health care providers, but few researchers have looked at which symptoms are most common or most distressful for patients. This may be due to a variety of reasons. For example, SVTs are seen more frequently in women, and women have traditionally been overlooked in clinical research (Kim & Menon, 2009). There are no disease specific questionnaires for patients with SVT, and there have been no reports of the psychometric properties of the investigator-developed, study-specific instruments that have been used. (Gursoy, Steurer, Brugada, Andries, & Brugada, 1992). An instrument sensitive to the symptoms experienced by different types of SVT patients would enable researchers to examine both the symptom experience and intervention outcomes from the patient's perspective. However, only one existing tool specific for arrhythmia patients was located. Developed by Bubien, Knotts-Dolson, Plumb, and Kay (1996), this tool was designed as a checklist of symptoms for patients with atrial fibrillation. The two arrhythmias, atrial fibrillation and SVT, differ physiologically with resulting distinct patient symptoms. Also, the atrial fibrillation questionnaire did not measure all components of what patients expressed as important concerns. Patient concerns about the negative effects of SVT on their ability to carry out daily activities, as well as concerns about the frequency and duration of episodes, could not be measured using the atrial fibrillation checklist.

As part of a study designed to examine how ablation changes patients' perception of the arrhythmia experience and affects quality of life, we developed a new questionnaire for patients with SVT to address important disease-specific experiences. In this article, the investigators reports (a) the development and initial process of content validation of the questionnaire measuring symptom experiences and the impact of the arrhythmia on patients' lives, and (b) the sensitivity testing of this new questionnaire in a sample of patients with SVT.

Methods

Description of Setting and Sample

All patients for the multiple phases of this study were recruited over a 1 year period from two settings: a 585 bed tertiary care, university affiliated medical center and a 400 bed private community hospital. All patients with regular, narrow QRS complex tachycardias, generally referred to as SVT rhythms, were eligible. Adults ≥ 18 years old who spoke, read, and understood English were included in the study. Participants needed to be physically and mentally able and willing to participate. To be included, patients also needed a confirmed diagnosis of SVT, obtained at the time of intracardiac electrophysiological testing. Specific diagnoses included atrioventricular nodal reentrant tachycardia (AVNRT), atrioventricular reciprocating tachycardia (AVRT), atrial tachycardia (ATACH), inappropriate sinus tachycardia (IST), or atrial flutter (AFL). Finally, inclusion criteria required the patients to have undergone a successful ablation procedure.

Patients were first identified as potential subjects from electrophysiology lab schedules prior to radiofrequency catheter ablation. Contact with patients was first made in the hospital following the electrophysiological testing and ablation procedure because of the need to establish the SVT diagnosis through intracardiac electrophysiological testing. Patients were screened for inclusion and eligible patients were approached in their hospital room after

recovering from sedation. For eligible patients, informed consent was obtained as approved by the Committees on Human Research at both of the medical centers. All participants giving consent were given verbal and written information about the details and voluntary nature of the study and a questionnaire to complete at home and return by mail anonymously in a postage paid envelope.

Disease-Specific Questionnaire Development Framework

According to Lynn (1986), the process of content validation for self-report instruments includes two stages. The first stage consists of domain identification, item generation, and instrument construction; the second stage had two components-- judgment and quantification. An approach suitable to the first state would involve a rigorously designed and executed, qualitative study to assure that the concept is understood and precisely defined (domain identification), and that measures are derived from these data (item generation and instrument construction; Lynn; Nunnally & Bernstein, 1994). The second stage in the process of content validation has traditionally been achieved by inviting review by a panel of experts who judge each item and the total scale for its representation of the conceptual domain (Grant & Davis, 1997; Lynn). When an instrument is derived from qualitative data, using informants from the qualitative study as content experts is a means of assuring that the instrument reflects the meaning of the phenomenon being measured (Grant & Davis).

Domain Identification

A disease-specific questionnaire was developed and tested in this study - the Patient Perception of Arrhythmia Questionnaire (PPAQ). The questionnaire was developed through qualitative research using individual interviews with 25 patients with a variety of types of SVT. This work has been previously described elsewhere (Wood et al., 2007). A synopsis of the study follows because it was the foundation of the questionnaire reported here.

Grounded theory methodology was used to guide sampling, data gathering, coding, and theory generation. A semi-structured interview guide was used to explore how patients' lives had been affected by having SVT. The interview guide was developed from clinical experience (KW, BD, MS) and review of prior research findings (Walfridsson & Walfridsson; Wood, Drew, & Scheinman, 1997). The 25 patients, 10 men and 15 women aged 18 to 81 years, were interviewed within 24 hours to 1 week following an ablation procedure for treatment of the SVT.

A clinical investigator with 15 years of experience in arrhythmia patient care identified conceptual distinctions and patient concerns related to living with SVT. The process of obtaining a correct diagnosis and referral for treatment was found to be more time consuming and difficult for women than men (Wood et al., 2007). Through reviews of the coding schema and transcripts from the qualitative study, the consequences of living with SVT were further categorized into four main concerns related to (a) episode frequency and duration, (b) symptoms and the extent to which patients perceived these symptoms as bothersome, (c) the range of daily activities curtailed by the SVT episodes, and (d) the extent to which daily activities were interrupted or restricted due to the arrhythmia episodes. We used these four main concerns related to the consequences of living with SVT to develop the new questionnaire reported here—the PPAQ.

Item Generation and Questionnaire Construction

Items were generated for each of the four concerns. In addition, we generated a list of outcome variables that were hypothesized to be sensitive to clinically important change following ablation or other healthcare interventions in patients with arrhythmias.

Episodes—Two questions pertained to the frequency and duration of arrhythmia episodes; both were developed using ordinal scales with Likert-type response choices. The question on the *frequency* of episodes used choices ranging from 0 (*not at all*) to 9 (≥ 3 *times a day*). The question on the *duration* of episodes used Likert-type response choices ranging from 1 (*a few seconds*) to 8 (*longer than 1 hour*). Patients not experiencing any episodes were scored as 0.

Symptoms—To develop a list of appropriate and representative symptoms with content validity, a symptom list was obtained by having 10 patients with SVT, 10 cardiac registered nurses (RNs), and 10 physicians list symptoms associated with SVT. The patient group consisted of 9 women and 1 man, all of whom had one of the three main types of SVT: AVNRT, AVRT, or ATACH.

Patients were approached in the waiting room of the outpatient electrophysiology offices at the two medical centers and asked to write down 10 symptoms they had experienced with their fast heart rhythm. The 10 RNs were all experienced cardiac nurses who worked in outpatient cardiology offices, the cardiac intensive care unit, the electrophysiology lab, or the cardiac section of an emergency department. The RNs who participated had at least 6 months of experience with arrhythmia patients. The 10 physicians were either attendings in cardiology/electrophysiology or completing an electrophysiology fellowship.

The total 300 symptoms obtained from patients, nurses, and physicians were assembled into a list. The majority of the symptoms were not unique, because different terms were often used for the same symptom (for example...“fast heartbeats,” “heart racing,” “tachycardia,” and “palpitations”). When paring down the list, patients’ wording of a symptom was chosen over the medical term. This yielded one symptom list with 14 unique symptoms.

To insure that our symptom list was inclusive, we compared our list of 14 symptoms to a published checklist of symptoms for patients with atrial fibrillation (Bubien et al.). The published checklist, known as the Atrial Fibrillation Symptom Frequency and Severity Checklist, contains 16 atrial fibrillation related symptoms; patients are asked to indicate the frequency of symptom occurrence and the severity of the symptom (Bubien et al.). Five symptoms were the same on our list and the published list; seven symptoms were similar, but worded differently; and four symptoms were unique to the published checklist. We did not change the wording on our list of 14 symptoms but added the four unique symptoms from the published atrial fibrillation checklist. After addition of these symptoms, including a space allowing patients to write in another symptom, our list totaled 19 possible symptoms.

Next, we generated two questions for each symptom on the list. One question concerned whether patients had experienced the symptom with their episodes of fast heart rhythm (*yes/no*). For symptoms that were endorsed by the respondent, we asked how bothered the patients were with Likert-type response choices ranging from 0 (*not at all*) to 4 (*extremely bothersome*). Preliminary construct validity was explored by using known-groups techniques. *A priori*, we hypothesized that the most symptomatic patients, those with IST, should report a higher number of more bothersome symptoms and longer, more frequent episodes than other SVT patients.

Impact on life—To measure the influence of the arrhythmia on areas of daily life, 10 new items were developed by the investigators on activities and areas of life commonly affected by SVT. Drawn from clinical experience, previous findings in the literature, and our qualitative research, items included physical, emotional and social functioning, sleep, mood, driving, work, recreation, and relationships with a significant other. Patients were asked to indicate the extent to which the arrhythmia interfered with these activities on an ordinal scale with Likert-type response choices ranging from 0 (*not at all*) to 4 (*extremely*).

Exploratory factor analysis was carried out on the 10 items included in the impact on life scale to examine their dimensionality and the associations between individual items and the concept of the impact of SVT on activities of daily life. Before conducting the factor analysis, we performed the Kaiser-Meyer-Olkin test of sampling adequacy (KMO) and Bartlett's test. The value of the KMO index was .90, indicating the adequacy of the correlation matrix for factoring. The Bartlett's chi-square statistic was 472.92 which was significant ($p < .001$), indicating that there was sufficient collinearity to proceed with factoring.

Maximum likelihood extraction was chosen because our data were normally distributed and this technique permits significance testing of sequential factors to determine the model with the best fit to the data. Four criteria were used to guide interpretation of results and decisions related to item retention: (a) Eigenvalues > 1.0 , (b) scree plot characteristics, (c) factor loadings of at least .40 on the primary factor, and (d) for interpretability, clinical experience and previous findings from the literature (Nunnally & Bernstein). Items were eliminated if (a) there was a relatively high loading ($> .50$) on more than one factor and (b) the items did not contribute to factor interpretability (Nunnally & Bernstein).

Restricted activity days—To assess a count of how often daily activities were interrupted or changed as a result of the arrhythmia, we used two questions, called restricted activity day questions. Patients were asked the number of days in the prior 4 weeks during which they had to: (a) miss work or school due to the arrhythmia, or (b) cut down on normal activities due to the arrhythmia. The two restricted activity day items were counts of the number of days in the prior 4 weeks where activities had to be restricted or decreased. These items had a possible score range of 0–28.

Judgment and Quantification

Expert review of the questionnaire—Content validity of the PPAQ was further assessed by a panel of expert clinicians and pilot tested in a sample of patients with SVT to assess the patient perspective of the instrument. The experts were chosen based on their professional education and training, years of clinical experience with arrhythmia patients, their experience in arrhythmia patient outcome research, their familiarity with other commonly used cardiac patient questionnaires, and their willingness to participate. As suggested by Lynn and others (Grant & Davis; Grant & Kinney, 1992), we called upon two medical and three nursing experts from geographically different areas of the U.S. and Canada to assess the questionnaire. The two physicians were electrophysiology faculty and the three nurse experts were master's prepared advanced practice nurses (two arrhythmia clinical specialists and a nurse practitioner). These experts were asked to evaluate the PPAQ specifically for whether (a) individual measures related to the four main concerns and (b) the questionnaire was representative and inclusive of their clinical experiences with arrhythmia patient concerns.

Using the Waltz and Bausell (1981) method of calculating a content validity index (CVI), the experts were asked to respond on a 1 (*not relevant*) to 4 (*extremely relevant*) response scale. The CVI was the proportion of items our experts rated with a score of 3 or 4. Our experts agreed that 100% of the 7 items on the PPAQ were *extremely relevant* to the original four qualitatively derived concerns. Although a good CVI was demonstrated, three experts marked one of the items, the symptom list, as *relevant, but needs minor alteration*.

To further evaluate content validity and respondent burden, in a pilot test the questionnaire was administered to 30 patients with SVT. The pilot test involved 18 women and 12 men, ages 19 to 46, with a variety of types of SVT. The patients were asked to judge the clarity of the instructions, the difficulty of the items, the appropriateness of questions, and the extent to which the questions addressed their major concerns in living with SVT. They were also asked to comment on the inclusiveness of the list of symptoms and note, in their own words, symptoms

that were missing or questions they had about any listed symptom. Good variability was noted on all the measures.

Revisions based on initial psychometric evaluation—Our panel of clinical experts and patients with SVT in the pilot study provided feedback about what was missing from the measures, and about how well they understood items and instructions. Additionally, we had two doctorally prepared measurement experts review the measures from a survey design perspective. We revised items based on all comments. We clarified wording in patient instructions, item stems and response choices, and eliminated symptoms that patients found confusing or thought inappropriate. No changes were made to the items measuring the frequency and duration of episodes; however, revisions were made to the list of symptoms. Two symptoms were added (“blurred vision,” “pounding feeling in neck”), three were eliminated (“weakness,” “shortness of breath,” and “chest pain or pressure when your heart is not racing”), and one complex symptom (“heart fluttering/skipping”) was separated into two symptoms (“heart fluttering” and “heart skipping”) yielding a total of 19 possible items in the PPAQ at this stage of development. The symptom of “heart fluttering/skipping” was separated into two distinct symptoms due to concern that the questionnaire attempt to differentiate between patient perceptions of a regular SVT (“fluttering”) and an irregular tachycardia such as atrial flutter with a variable A:V block (“skipping”). The 10 items pertaining to the impact on life scale were unchanged. Also, an option of *not applicable* was added to the missed workdays question to eliminate confusion for patients who were neither working nor in school.

Statistical Analysis

Statistical analyses were conducted using SPSS for Windows (version 15; SPSS, Inc., Chicago, IL). Significance was set at 0.05 for all omnibus testing of group differences. Demographics and questionnaire items for the total sample, as well as type of SVT, were analyzed using ANOVA and regression as appropriate. Kruskal-Wallis tests were used to ascertain if differences existed among SVT groups for frequency and duration of episodes. For the ten pairwise Mann Whitney-U post hoc contrasts, alpha was set at .005 to determine significance. Although the Frequency and Duration of episode measures were scored and analyzed on an ordinal scale from 0–9 for frequency and 0–8 for duration, the time periods were collapsed to 5 categories for data presentation.

Internal consistency of the 19-item list of symptoms was estimated using the Kuder-Richardson 20 (KR-20) technique, a special case of Cronbach’s α coefficient for dichotomous data. Reliability was estimated for the 10 items on the impact on life scale using Cronbach’s α coefficient.

Questionnaire Psychometrics

Factor analysis of the 10 items in the impact of the arrhythmia scale yielded Eigenvalues for each item ranging from 6.2 to .12. Using the predefined criteria for examining the dimensionality of the scale, only one factor had an Eigenvalue > 1. Examination of the scree plot demonstrated a clear break on the plot after the primary factor; the factor loadings indicated that all items loaded on one factor (Table 1). The single factor solution explained 62% of the total variance. Goodness of fit testing yielded a chi square statistic of 76.44 which was significant ($p < .01$). No items were removed from the scale because no loadings were < .40, none loaded on more than one factor, and all items contributed to the range of possible activities that could be affected by the SVT episodes. Therefore, the factor analysis was interpreted to support the unidimensionality of this scale identified as “impact of arrhythmia on routine activities of life” (Impact on Life). One summated ratings score was created for the 10-item Impact on Life scale, and scores were transformed to a 0 to 100 scale so that a higher score showed more adverse impact of the arrhythmia on one’s life. High internal consistency was

demonstrated for the dichotomous symptom list by a KR-20 result of 0.84. Evidence of good reliability for the 10-item Impact on Life scale was demonstrated by a Cronbach's alpha score of .93.

The final version of the *PPAQ* administered to the sample of 103 patients with SVT included seven measures (33 items) drawn from the original four concepts: frequency of episodes, duration of episodes, total number of symptoms, extent to which symptoms were bothersome, the impact on daily life activities subscale, number of days missed from work or school due to arrhythmic episodes, and the number of days normal activities were cut down on due to arrhythmic episodes. The items on the questionnaire are presented in Appendix A.

Results

A convenience sample of 223 consecutive patients referred to the electrophysiology services at both institutions were screened for eligibility. Seventy-three patients were ineligible and three patients declined to participate. The final sample included 147 patients who met inclusion criteria, and 103 (70%) patients returned questionnaires.

Questionnaire Participant Characteristics

The gender and age breakdown for the total sample, as well as by SVT group are presented in Table 2. There was a range of ethnicities and marital and employment status in the sample, but the majority of subjects were married (66%) and Caucasian (83%). Forty-five percent were employed full time. Of note is that all participants with IST were female, and they were also the youngest age group.

Participant history and chart review indicated a low incidence of structural heart disease, but 10% ($n = 10$) of participants had a history of coronary artery disease and 16% ($n = 16$) had a history of hypertension. Left ventricular function, evaluated by transthoracic echocardiogram, was normal, with a mean of 64% ($SD = 5$). All participants were off anti-arrhythmic drugs for the standard time of five half-lives at the time of electrophysiology testing. Participants reported having tried a mean of two ($SD = 2$) anti-arrhythmic drugs prior to ablation, and having experienced a range of 0–15 cardioversions ($M = 1$, $SD = 2$). Emergency department visits within the last year ranged from 0 to 10 visits ($M = 2$, $SD = 2$).

Sensitivity of the Questionnaire

Episodes—We tested the relationships among these variables by ordinal regression of frequency and duration by type of SVT adjusting for age and gender. The regression yielded non-significant findings for both age and gender. Similar findings were noted for age and gender in the regression of episode duration by type of SVT. Therefore, age and gender were not controlled for in the final Kruskal-Wallis analyses of the two ordinal variables by type of SVT. Duration of episodes did not significantly differ by type of SVT; however, frequency differed significantly ($p < .01$).

Forty-two percent of the sample experienced episodes at least daily. However, the ATACH and IST groups reported significantly more frequent episodes than other groups ($p < .01$). No IST participants reported episodes less often than once a day. Thirty-nine percent of the sample reported episodes lasting longer than 1 hour. The differences by type of SVT in duration of episodes did not reach significance, but 46% of ATACH and 67% of AFL participants reported episodes lasting more than 1 hour.

Symptoms—The count of symptoms ranged from 0 (no symptoms) to 19 (all symptoms). Scores for the extent to which the symptoms were bothersome ranged from 0 to 72, with higher

scores indicating that symptoms were more bothersome. As shown in Table 3, a mean of 8 symptoms was reported by the sample, with an overall symptom bothersome score of 28. Fatigue and palpitations (heart racing) were the two symptoms most frequently reported by the sample.

Participants with IST reported significantly more symptoms ($M = 13$, $SD = 3$) than other groups, with the exception of the ATACH group; AFL participants reported the lowest number of symptoms of all groups at 6 ($p < .01$, $SD = 3$). Participants with IST reported significantly higher bothersome scores than other participants ($p < .01$). The most distressful symptoms for the total sample were “heart racing” and fatigue. The symptoms of “hard to catch breath” (dyspnea) and “chest discomfort during heart racing,” although less prevalent, were noted to be moderately bothersome when they did occur.

Impact on life—The mean impact on life score was 39 indicating a moderate impact of SVT episodes on participants’ lives. SVT episodes limited patient activities in a variety of areas. The activities most affected were the ability to drive a car and participate in social activities. Interference was also noted in personal relationships with significant others and ability to sleep. The impact on life scores significantly differed between tachycardia groups ($p < .01$). The ATACH and IST groups showed more interruption in their lives, with impact scores of 62 ($SD = 21$) and 59 ($SD = 14$), respectively; these were significantly worse than the scores for the AVNRT group.

Restricted activity days—Nearly the full range of scores (from 0 to 28 days) was seen for each restricted activity day question. Participants reported having to miss work or school a mean of 3 days/month ($SD = 8$) and they cut down on activities they would normally have participated in for a mean of 9 days/month ($SD = 11$) due to the SVT. Participants with IST reported cutting down on normal activities significantly more days per month than all other groups ($p < .01$).

Discussion

Our findings provide preliminary evidence of the process of psychometric evaluation of the PPAQ in patients with SVT, suggesting the questionnaire could be useful in future research measuring patient perceptions of arrhythmias. To our knowledge, this is the first report of the psychometric properties of a disease-specific questionnaire measuring aspects of life affected by SVT. The questionnaire was easy for patients to use, and they could complete it in a short period of time, indicating a low respondent burden. The PPAQ also was easy for researchers to score.

Internal reliability coefficients (Cronbach’s alpha and KR-20) for multi-item scales exceeded the .70 reliability standard for group comparisons (Nunnally & Bernstein). In this study, the process of construct validation showed consistency with our expectations of symptom experience scores in a group of SVT subjects. Responses to all measures on the questionnaire showed sensitivity to detect differences and variability of scores.

Our findings confirm other previously published reports about the affect of SVT on patients’ lives, but also provide several new important insights about episodes of symptomatic SVT, the frequency and duration of episodes, the number and prevalence of specific symptoms associated with episodes of SVT, the influence of these episodes on participants’ lives, and the ways in which these symptoms differ between types of SVT. Previous investigations of clinical symptoms in SVT participants have been retrospective or qualitative in design (Walfridsson & Walfridsson; Wood et al., 1997; Wood et al., 2007), or researchers combined several types of atrial and ventricular arrhythmia participants for analyses (Bubien et al., 1996; Hamer,

Blumenthal, McCarthy, Phillips, & Pritchett, 1994), or explored only one symptom (Gursoy et al., 1992; Zimetbaum & Josephson, 1998). Patients' perspectives have been noted in some of these studies about a few selected symptoms such as palpitations or lightheadedness, but more detailed symptom information has not been reported. Other researchers have noted the frequency of SVT episodes as ranging from monthly to ≥ 4 times per month and durations from seconds to 30 minutes (Lessmeier et al.; Wood et al., 1997). Our findings provide further details about the frequency and duration of episodes, which have not previously been explored in detail from participants' perspective.

Data from the current study indicate that patients with SVT have a range of symptoms that affect their life, with an average of 8 moderately bothersome symptoms out of 19). We found a higher prevalence of diaphoresis, nausea, polyuria, and blurred vision, chest pressure when the heart was racing, but lower rates of palpitations, syncope, and dizziness than reported in previous studies (Bubien et al., 1996; Luria, 1971; Wolff, 1942; Wood et al., 1997). The incidence of tachycardia polyuria, noted in the literature as occurring in 5% to 19% of patients with SVT (Luria; Wolff), was found in 25% of our sample. Fatigue was noted in a high proportion (78%) of patients in our study. In clinical settings, patients report experiencing fatigue that lasts hours to days longer than the actual episode of SVT, although the physiological reasons for this remain unclear. We identified proportions of patients experiencing symptoms of warmth/flushing and dyspnea similar to those reported by other researchers who have noted clinical symptoms in SVT patients (Luria; Wolff).

Patients in our study reported that the SVT had the greatest negative affect on their lives in the area of driving habits. Patients' social life, relationships with significant others, and sleeping ability were also negatively affected. Patients reported having to cut down on activities for over 1 week a month due to the SVT episodes. This has lifestyle and economic ramifications for relatively young patients in the prime of their work life who become limited in their jobs or daily activities for numerous days each month due to the SVT episodes.

In our study, symptoms varied in patients with different types of SVT. Patients in the IST and AFL groups differed in demographics, gender, heart rate during SVT, and symptoms from patients in the other SVT groups. Patients with IST reported more symptomatic episodes, more adversely affected activities, and more days with decreased activity due to the arrhythmia than patients with AVNRT, AVRT, or AFL. Patients with IST and ATACH were the most symptomatic with SVT; patients in the AFL group were the least affected. In contrast to findings in classic cardiac textbooks and papers (Gursoy et al.; Jayam & Calkins, 2008; Zimetbaum & Josephson), the symptom of "pounding feeling in neck" in our study was not found to be a distinct diagnostic marker for AVNRT; rather, it was more prevalent in patients with IST and ATACH. Our findings on the lack of specificity of neck pulsations as a diagnostic symptom of AVNRT have also been supported by recent data from other investigators (G. Marcus, personal communication, July 9, 2008).

The greatest limitations to this study pertain to sampling and recall bias. Subjects were recruited from two tertiary care centers, where patients may be expected to be more symptomatic. Therefore, the results may not be representative of SVT patients drawn from the general population. The gender and age confounding noted in the IST subgroup in this study could have potentially been related to nuances of the small sample size. Researchers are cautioned to use purposeful sampling to include men in future studies of patients who have this condition. Because our inclusion criteria required both knowledge of the intracardiac diagnosis at the time of ablation and success of the ablation procedure, we did not access patients until after their ablation procedure was completed. Therefore we may have introduced recall bias in asking patients to reflect upon their pre-ablation symptom experiences. We attempted to minimize this by asking the patients to complete the questionnaire as soon as possible after the ablation.

Other limitations include those inherent to all survey research, including under reporting of undesirable characteristics, and over reporting of desirable behaviors. However, these were mitigated in the present study through the use of anonymous return mail surveys.

The validation of any questionnaire is an iterative process of demonstrating data that demonstrate that the instrument performs as expected. The process of content validation described in this report for the PPAQ was an initial step in the psychometric testing and development of this questionnaire, and further use will contribute additional information on the psychometric evaluation of this instrument. The process of construct validation was initiated by demonstrating the ability of the PPAQ to distinguish aspects of the symptom experience that differed among participants with different types of SVT. Future researchers need to confirm the performance of this questionnaire in patients with other types of arrhythmias.

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Table 1

Factor Loadings for Impact on Life Scale (N=94)

Item	Statement	Factor Loadings	Communalities
How much did your fast heart rhythm interfere with...			
3d	normal work?	.864	.817
3g	your social activities?	.852	.748
3f	your enjoyment of life?	.836	.748
3b	ability to walk or move about?	.822	.732
3e	your recreational activities?	.777	.692
3i	your relationship with spouse/partner or boyfriend/girlfriend?	.741	.615
3a	your mood?	.721	.631
3j	your sexual relationship with spouse/partner or boyfriend/girlfriend?	.699	.535
3c	your sleep?	.644	.438
3h	your ability to drive a car?	.615	.425
Total Variance Explained by one factor solution		62%	

Table 2

Demographic Characteristics of Patients with Supraventricular Tachycardias (N=103)

Mean (SD)	Total Sample n= 103	AVNRT n=32	AVRT n=18	ATACH n=11	IST n=13	AFL n=29	p value
Age in years	49 (18)	50 (15)	37 (12)	42 (12)	31 (8)	65 (14)	<.01 ^a
Range	18–85	24–84	18–68	24–59	18–42	20–85	
Female (%)	53	81	40	64	100	7	<.01 ^a
Years Living with SVT	10 (12)	15 (16)	13 (13)	10 (10)	7 (6)	4 (3)	<.01 ^b
HR during SVT (bpm)	155 (42)	168 (36)	186 (36)	162 (27)	144 (31)	124 (40)	<.01 ^c
LVEF (%)	64 (5)	65 (1)	65 (1)	63 (3)	65 (1)	59 (9)	<.01 ^d

Note. SD= standard deviation; AVNRT= atrioventricular nodal reentrant tachycardia; AVRT= atrioventricular reentrant tachycardia; ATACH= atrial tachycardia; IST= inappropriate sinus tachycardia; AFL= atrial flutter; SVT= supraventricular tachycardia; HR= ventricular heart rate; bpm: beats per minute; LVEF= left ventricular ejection fraction per transthoracic echocardiogram.

^a = AFL group significantly different from all others;

^b = AFL group different from AVNRT;

^c = AFL group different from AVNRT & AVRT;

^d = AFL group different from AVNRT, AVRT, & IST.

Table 3
Patient Perception of Arrhythmia Scores for Total Sample and By Type of Arrhythmia (N=103)

Questionnaire Measures	Means (SD)					p value
	Total Sample N= 103	AVNRT n=32	AVRT n=18	ATACH n=11	IST n=13	
<i>Symptoms</i>						
Number of symptoms (0-19)	8 (4)	9 (4)	8 (3)	9 (5)	13 (3)	6 (3) <.01 ^a
How Bothersome was symptom (0-72)	28 (18)	28 (15)	17 (15)	28 (18)	45 (11)	22 (15) <.01 ^a
<i>Impact of Arrhythmia on Life</i>						
Impact on life (0-100)	39 (25)	29 (21)	40 (24)	62 (21)	59 (14)	30 (23) <.01 ^b
<i>Restricted Activity Days</i>						
Days missed work/month (0-31)	3 (8)	0.2 (1)	3 (7)	5 (10)	9 (12)	3 (82) n.s.
Days cut down/month (0-31)	9 (11)	7 (9)	6 (8)	14 (15)	23 (7)	6 (9) <.01 ^c

Note. All measures were scored so that a higher score indicates more adverse effect of arrhythmia. SD = standard deviation; AVNRT = atrioventricular nodal reentrant tachycardia; AVRT = atrioventricular reentrant tachycardia; ATACH = atrial tachycardia; IST = inappropriate sinus tachycardia; AFL = atrial flutter; n.s. = results not statistically significant for this test.

^a = IST significantly different from all other groups;

^b = IST significantly different from AVNRT and AFL;

^c = IST group significantly different from AVNRT, AVRT, AFL groups.