

Assessing the Needs and Experienced Problems of Adolescents with Acne: A Mixed-Method Study

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English abstract

Title: Assessing the needs and experienced problems of adolescents with acne: A mixed-method study.

Background: Acne is a common skin condition among adolescents. The Skin house, a Dutch online dermatological patient portal, aims to improve patient care by supporting exchange of effective treatment between professionals and patients through the development of self-management programs.

Rationale: Many adolescents are not aware of effective available acne treatment. Attending the expressed needs of adolescents may positively attribute to developed interventions.

Aim and research questions: Experienced problems, educational- and supportive needs and website preferences of young adolescents with acne were researched. These results might attribute to the further development of an online self-management program on the Skin House to reach better health outcomes.

Methods: A mixed-methods study according to an explanatory sequential design was performed. Dutch adolescents with acne, aged 16 – 25 years, recruited at educational-and health organisations and via social media were invited to complete an anonymous digital survey. The survey consisted of the Cardiff Acne Disability Index, the Patient Need Questionnaire and two self-constructed questions on educational and supportive needs. Participants were additionally asked to take part in an online focus group.

Analyses: Quantitative data were analyzed using IBM, SPSS® version 20. Qualitative data were analyzed on key aspects of used topics.

Results: 69 adolescents with mild acne filled out the survey, five participated in the focus group. Adolescents expressed educational needs on knowledge about skin care and products, etiology, influencing factors on acne and professional treatment options. They positively rated the development of a website about acne with relevant and accurate information, easily accessible, and attractively displayed.

Conclusion: Most important needs were derived from adolescent's experienced physical impairments resulting in a need for support on acne-specific reliable information. Professional and online support by a self-management tool on a website were positively rated.

Recommendations: Attention should be paid to the reliability and trustworthiness of a website.

Keywords: acne, self-management, digital_portal, needs, website_preference

Dutch summary

Titel: Het beoordelen van de behoeften en ervaren problemen van jongeren met acne: een gemengde methode studie.

Inleiding: Acne is een veel voorkomende huidaandoening onder adolescenten. Het Huidhuis, een Nederlands patiënten portaal voor huidaandoeningen, wil patiëntenzorg verbeteren door het uitwisselen van effectieve behandelplannen tussen professionals en patiënten door het ontwikkelen van zelfmanagement programma's.

Achtergrond: Veel jongeren zijn niet op de hoogte van bestaande behandelplannen voor acne. Rekening houden met de behoeften van adolescenten kan positief bijdragen aan de ontwikkeling van interventies.

Onderzoeksvragen en doel: De ervaren problemen, behoeften aan informatie en ondersteuning van jongeren met acne en voorkeuren voor het inrichten van een website zijn onderzocht. De resultaten kunnen bijdragen aan de ontwikkeling van een digitale zelfmanagement programma op het Huidhuis.

Methode: Een gemengde methode studie werd uitgevoerd volgens een verklarende sequentieel ontwerp. Nederlandse jongeren met acne, tussen de 16 - 25 jaar, werden benaderd via onderwijs- en gezondheidsorganisaties en sociale media en uitgenodigd om een digitale enquête in te vullen. Vervolgens werd gevraagd om deel te nemen aan een online focusgroep.

Analyse: Kwantitatieve gegevens van de enquête werden geanalyseerd met IBM, SPSS® versie 20. Kwalitatieve gegevens werden geordend op basis van de belangrijkste aspecten van de gebruikte thema's in de focusgroep.

Resultaten: 69 adolescenten, met milde acne, vulden de enquête in. Vijf namen deel aan de focusgroep. Adolescenten uitten behoeften aan kennis over huidverzorging, producten, etiologie, beïnvloedende factoren en opties voor professionele behandeling. Een website over acne met relevante en accurate informatie, makkelijk toegankelijk en helder weergegeven werd als nuttig beoordeeld.

Conclusie: Geuite behoeften kwamen vooral voort uit lichamelijke beschadigingen. De adolescenten wilden graag ondersteuning bij het krijgen van specifieke informatie over acne. Ondersteuning via een zelfmanagement programma op een website en door professionals werden als nuttig beoordeeld.

Aanbevelingen: Het is van belang om aandacht te besteden aan betrouwbaarheid en de geloofwaardigheid van de website.

Trefwoorden: acne, zelfmanagement, digital_portal, behoeften, website_voorkeuren

Introduction

Acne is a common skin condition among patients in the age of 12 to 24 years, affecting 91% of male and 79% of female adolescents in the Netherlands (1,2). Acne is a complex disease process that varies from minimal to serious acne, frequently fluctuates in intensity and may cause permanent lesions (3,4). Acne can lead to disturbing subjective symptoms like depression, anxiety and lower self-esteem (3,5). Because of the chronicity of many cases the impact on adolescents is quite high, even suggesting an impact that is similar to patients suffering from systemic diseases (e.g. diabetes mellitus) (4). All these effects can cause a reduction of quality of life for adolescents with acne (6).

Although effective treatment of acne has been developed in recent years (2,7), misconceptions exist about the influencing factors and adequate therapy among healthcare professionals (8-10). Also adolescents have poor knowledge about causes, aggravating factors and management of acne (10,11), possibly resulting in delayed presentations to professionals (12). Many adolescents treat and manage acne by themselves, not all perform effective treatment or are compliant to treatment regimens (12).

Recently a Dutch online dermatological paediatric patient portal “The Skin House” has been developed to diminish the burden of dermatological illnesses and improve quality of care. The Skin House aims to improve patient care by promoting easy and efficient exchange of evidence-based guidelines for children, parents and healthcare professionals. The Skin House offers information to enable self-diagnosis and is developing self-management programs and online communities for patients (13).

Self-management for people with chronic diseases is considered a common part of treatment nowadays (14). Self-management interventions aim to increase individuals' abilities to manage symptoms resulting of a chronic illness, and adhere to treatments along with physical and psychological consequences (15). Although evaluations of online self-management interventions among adolescents are scarce (16) a previous study among adolescents with asthma in the Netherlands reported positive changes in asthma control (17). Contribution to acquired knowledge and skills, understanding from social support (18) and tailored programs addressed to the individuals needs are believed to positively attribute to the effectiveness of self-management interventions (14). Improved health outcomes are seen when content of programs have been developed by carefully attending the expressed needs of young people (18-20).

Therefore we believe that assessment on educational needs, like needs for knowledge and skills, and on supportive needs, like content and preferred support, based on

actual experienced problems of Dutch adolescents with acne will successfully attribute to the development of a self-management program on the Skin House.

Problem statement

Although many adolescents with acne treat themselves, not all perform and are aware of effective available acne treatment. Suffering from acne can negatively influence quality of life. To increase adolescents abilities in managing symptoms of acne and to support them, a careful assessment of experienced problems and needs among young Dutch acne patients is needed.

Aim

The aim of this study is to explore the identified problems and needs of adolescents with acne to attribute to the development of an online self-management intervention tool of the Skin House to reach better health outcomes by improved professional treatment.

Research Questions

- What are the experienced problems and educational and supportive needs of Dutch adolescents with acne?
- What are the website preferences of Dutch adolescents with acne to address their needs within a self-management tool of acne?

Methods

Design

A mixed methods study according to an explanatory sequential design was used. Performing qualitative research build on previous collected quantitative data enabled a more complete insight regarding the research questions (21), which was in line with the explorative and descriptive character of the study.

Setting and participants

The study population consisted of self-selected Dutch adolescents with acne. Adolescents were included if they self-identified any form of acne severity, lived in the Netherlands, had Internet access, were able to use a digital device and speak and write Dutch. For ethical and pragmatic considerations adolescents in the age 16 – 25 were included, since adolescents above 16 are legally self-responsible without adult supervision to take part in health research. All races and both sexes were included.

Researchers or health professionals invited participants by hardcopy or digital invitation to the study, which was accessible on a protected digital research environment (22). They were conveniently recruited at outpatient clinics, educational settings and by snowballing technique via social media (Twitter, Facebook) as well by informing direct environment of researchers about study.

A minimum sample size of 68 for the quantitative research was needed, calculated by Raosoft and based on the following assumptions: a normal distribution, an error of 10%, confidence level of 90%, a population size of 20.000 and a response distribution of 50% (23).

Participants of qualitative research were conveniently recruited within the quantitative research phase. They could voluntarily indicate their preference to further participation, using the same inclusion criteria as mentioned above. A sample of 12-14 participants was considered as sufficient, although no exact number of participants is set to reach saturation (24) but online focus groups offer the opportunity of more participants per group (25).

Ethical considerations

Adolescents could anonymously participate at time and place of personal preference. Intrusive questions were not included. Technical features ensured that the research could not be filled out without informed consent, which had been digitally obtained. The study protocol was no subject to the Dutch law on Medical Research involving Human subjects as confirmed by the institutional ethical committee of the UMC (#12-593).

Data collection

Demographic characteristics, acne impact, adolescents needs based on physiological-, social- and physical impairments, and the educational and supportive needs were examined by an web-based pilot-tested structured survey.

Needs and website preferences were additionally assessed within an online focus group (OFG). Data collection by the Internet was chosen because the Internet is a familiar medium for youth and has emerged as one of the main health information source for adolescents (26-28).

Survey

Demographics characteristics

Demographic characteristics assessed were: age, as control to research inclusion criteria. Gender, to incorporate exploration of problems and needs since previous research has shown different treatment preferences on the basis on gender (8), and skin colour, as parameter for race and ethnicity because there is a different incidence of related symptoms and experienced feelings among people with different ethnic skin colours (29,30). No easy accessible and validated measurement instrument was found to self-diagnose acne severity. Since adolescents with more serious acne more often see a dermatologist (29), the actual treatment had been used to indicate the level of disease severity.

Acne impact

Acne impact was measured by using the Cardiff Acne Disability Index (CAD I) questionnaire. The CAD I is a practical and widely used 5-item acne-specific questionnaire with 4 varying ordinal response options designed to assess the patient's performance, behaviour and level of disability (6,31). The CAD I had good reliability ($r=0,96$ ($p<0,001$) compared to another validated acne-specific scale and discriminant validity (6,31-33). For this study the original CAD I had been translated (for-and backwards) into Dutch, cognitive debriefed in adolescent population ($n=16$), discussed by experts, resulting in a positive review of harmonized translation by developer (33). Score of CAD I consisted of a summing of the separate scores; a higher overall score indicated a higher degree of the impact of acne.

Adolescents needs

Adolescents' needs were measured using the Patient Need Questionnaire (PNQ). This is a subscale of the Patient Benefits Index, consisting of 25 standardized items on a 5-point Likert scale (0 to 4, with ascending degree of disease burden and 5="not applicable to me"). PNQ was validated for use in patients with acne. Subscales enabled the determination of five

different dimensions: reducing psychological-, social- and physical impairment, impairments due to therapy and confidence into healing (30, 34), and two separate items, for details see Table 1. To obtain group mean sum scores, the code 0 (“not important at all”) and 5 (“not applicable to me”) were coded as 0, because each choice corresponded with no treatment need, as higher scores indicated a higher degree of individual-defined treatment objectives. This German instrument showed good feasibility, high responsiveness, good internal consistency (Cronbach’s alpha =0,96) (5,30), and good construct validity ($r=0,59$, $p \leq 0,01$, $n=764$) with another acne-specific instrument (31). This study used the Dutch version, previously translated according guidelines, for details see Short Manual PBI (35).

Table 1

Educational and supportive needs

The educational needs, like preferred knowledge and skills, and the supportive needs, like the actual support resources, were measured by two self-constructed structured questions.

Online focus group

Educational and supportive needs and website preferences were further researched using a moderated asynchronous (not-real-time) OFG. The website preferences concerned preferred content, format and person (professional/peers) of a self-management tool. A protected community on the patient portal “Skin House” facilitated the OFG, which lasted one week.

The OFG, as a cost-effective, easy accessible, convenient qualitative valid and objective method, was conducted according to developed guidelines for online data collection (36-38). The OFG consisted of three semi-structured discussion topics about: informational needs, supportive needs and website preferences. For details see Table 2. All topics were posted at the start of the OFG along with an explanation and encouragement to react on each other, to enable rich data (37,38). Unique login and usernames were assigned to each participant and guaranteed an anonymously access.

Both, by full identifiable named, researchers (HO, MZ) acted as moderators. They daily checked postings and posted additional questions trying to establish a non-inhibiting online environment. Participants could view the most recent contributions of the group and review earlier responses. Memos were made to record both researchers impressions of the

adolescents' responses to increase credibility (39). Dutch quotes made by participants were translated into English by researcher (MZ).

Table 2

Data analysis

Quantitative data on demographic-, CADI-, PNQ- and informational and supportive needs variables were analysed using frequency counts and split by gender using SPSS 20 for IBM (40). These analyses were useful to describe and explore the study population. Technical features prevented missing items. Only completed sub questionnaires were included in case participants stopped before finishing the survey.

Digital data of OFG were available by word file. Two researchers (HO, MZ) independently read these data and selected key aspects of all discussion topics (see Table 2) to improve reliability (21,39).

Results of both research methods were separately discussed and interpreted and finally integrated addressing the research questions by both researchers (HO,MZ) to attribute to the credibility of the study.

Results

80 Adolescents started the survey, 5 were not eligible, 6 quit without any reason, leaving 69 (86%) in the study, of which 73% completed the survey (see figure 1). Face-to-face recruitment at outpatient clinics and schools resulted in 38 % of the respondents, 15% responded via social media and 39 % responded by other snowballing techniques. Response rates of participation could not be assessed because of online recruitment procedure.

Figure 1

Survey

Demographic characteristics

More females (61%) than males (39%) participated (see table 3). Mean age of participants was 18,8 (SD \pm 2,5). Beside one female with light coloured skin all had white skin. 15% of males and 7% of females visited a professional, indicating mild to moderate acne.

Table 3**Experienced problems and derived needs**

The CADI assessed performance, behaviour and level of disability of the adolescents indicating the impact of acne. Male participants showed a lower score on the CADI (mean/sd: 1,4±1,5) compared to females (mean/sd: 3,4±1,5). Females rated highest scores on the question on their feelings about their appearance of the skin (mean/sd: 1,1±0,5) and actual acne severity (mean/sd: 1,0±0,5). Males equally scored on these two questions along with interference of acne with social activities (all mean/sd: 0,4±0,5).

Table 4

Adolescents rated treatment needs on the PNQ, based on the wish to reduce experienced impairments. All adolescents highly scored on the following three items: to be completely healed of acne, to have confidence in healing and the wish to have a faster improvement. As shown in Table 4 highest overall scores are given on physically induced impairments (mean/sd: 2,4±1,4) with high attribution of females (mean/sd: 2,7±1,1) to this dimension compared to males (mean/sd: 1,9±1,6). Adolescents also stressed needs to have confidence in healing (mean/sd: 2,1±1,6). Males additionally rated needs derived from psychological impairments, followed by impairments due to therapy and finally social impairments. Females higher rated experienced impairment due to therapy, subsequently on social and psychological impairments.

Educational and supportive needs

Highest rated educational needs were knowledge about skin care and available skin products (78%), followed by etiology and influencing factors (i.e. stress and food) (67%) and professional treatment options (63%). Females higher attributed to these needs compared to males (see Table 5).

Adolescents received most support from their parents and family members (80%), followed by general practitioner (48%) and friends (46%). Females also indicated high supportive rates to the Internet and pharmacy (see Table 6). 24% of respondents positively agreed on an ability to chat with a professional, and 6% to chat with other peers (see Table 5).

Table 5 and 6

Focus group

Seven survey respondents voluntarily agreed on participation in the OFG of which five actually participated. Two females did not respond without given any reason despite reminders of researcher (MZ). The OFG lasted from April 22 – 29, 2013.

Demographic characteristics

Three males and two females participated, one visited a dermatologist, and all others did not use any treatments. Compared to characteristics of survey the OFG consisted of more males (60 % versus 39 %) compared to females (40 % versus 61 %), were a little younger (mean: 17,6 versus 18,8), scored a lower CADI score (mean: 2,0 versus 2,6) and higher on each PNQ dimension. (See tables 4 and 7). All male participants responded once to each discussion topic, while female participants developed a little more interactive way of responding on moderators and each other's contributions. The majority of postings were short but all adequately answered the questions.

Table 7

Educational needs

With respect to content of education all participants showed a need for information on etiology, adequate skincare, aggravating and influencing factors like food and stress, when to achieve professional treatment and what to do to prevent scarring. One female participant summarized "*just all Do's and Dont's with respect to acne*". Participants stressed importance to trustworthiness, clarity, convenient accessibility and completeness of information. One male participant contributed: "*clarity is important to me because of the several options about what to do*".

Supportive needs

Participants showed support preferences regarding their educational needs. Support offered by a professional was given first choice. As one female participant said: "*a professional has medical knowledge about acne and treatment of skin condition which attributes to trustworthiness*". Tailored individualised online professional support is preferred above a chat room. The importance of anonymity in contact with professionals varied without disclosure of underlying reasons. They stated "*I would appreciate a possibility to ask questions to a professional and stay anonymously*" but also "*professional consultation doesn't need to be anonymous to me*". One male participant suggested the helpfulness of sharing information

about skincare, products and influencing factors on acne with peers. Participants stated no supportive needs with respect to managing their emotions.

Website preferences

Participants considered a website about acne as a helpful tool to fulfil their educational and supportive needs. They suggested a short name, a homepage with navigation links, vivid colours, relevant, accurate and “to the point” information to achieve an attractive, easy accessible, and understandable website. Some suggested an option to sign up for an informational weekly or monthly news bulletin. Use of videos and photos about etiology and skin care were preferred above large quantities of words. Facebook and twitter links to the site were positively rated.

They stressed out the importance of completeness and trustworthiness of the site. *“Recommendation by real life professionals of the website, photos and informational background of the online professionals may attribute to the credibility of the website”* added one male participant. To increase credibility this participant also suggested a limited use of photos, no advertising as well the development of a quality label for health websites. They positively rated a possibility by mail to contact with a medical professional, suggesting a flowchart format, which they considered helpful for professionals and for patients in formulating relevant questions.

Discussion

Most important needs were derived from adolescent’s experienced physical impairments resulting in a need for support on acne-specific reliable information. Professional and online support by a self–management tool on a website are positively rated.

Adolescents highlighted wishes for a complete healing and fast improvement of acne blemishes along with confidence in healing. Previous studies with larger populations (30,34) of acne patients confirmed our findings with respect to this major wish to be healed of the main symptom of acne: skin blemishes.

Adolescents expressed educational needs regarding acne skincare, available products, etiology and attributing factors of acne as well treatment options. These needs might be influenced by adolescent’s awareness of their actual low levels of acne knowledge, existing misinformation and poor acne management (8,11). These findings agree with other studies among adolescents suffering from other systematic diseases in their needs for general condition-dependent information (19,20,41).

Conducting the survey in winter might have lowered the CADl score since a question with respect to showing oneself in the swimming pool was less relevant. The higher CADl score of females on a question about feelings related to their appearance might explain their high agreement to their educational needs on skin care and products in contrast to men. Suggesting females' expectations to improve visual skin appearance with adequate care and products. These findings are in line with a previous study (8) on treatment preferences that found preferences for topical treatment within females with mild acne and preferences for systematic treatments within males.

Currently Dutch adolescents received most support from parents and family members. They stated preference for professional support on their educational needs. Reasons for delayed presentations to professionals in contrast to this, have not been revealed within this study, nevertheless variable preferences regarding anonymity might attribute to this.

Adolescents in our study showed less importance for support to manage emotions or needs to discuss their condition with peers in chat communities. In contrast to other studies among young asthma- and arthritis patients (18,19,41) who showed preferred support by other adolescents. The impact of acne on adolescents is suggested to be similar to the impact of other systematic diseases (4). However, the expected temporality of acne (1,2) along with a study population with mostly mild acne might explain this difference.

In line with previous studies we also found a need for online health information next to family, friends and general practitioners (26-28,42). Participants in this study showed a need for relevant, accurate online information, shortly formulated with non-complex language. Preferences were expressed to a clear presentation of information with use of visual cues, factors that also have been found to increase the satisfaction with a website in other studies (42,43).

Participants in this study gave a preference for a possibility to tailored professional online consultation. A previous study among adolescents confirmed preference for online communication with health professionals in case of well-controlled asthma (17). This preference may be grounded in the wish of adolescents to make autonomous health decisions by learned techniques and to be confident in dealing with their health-condition (19,20). Online consultation may give just enough confirmation to perform self-management.

Participants added importance to the expertise, reliability and trustworthiness of the website. Several studies confirmed our findings, like preferences to guide adolescents by own professionals to reliable and accurate websites (42,44,45), as well recommendations on how to recognize a reliable website (42), and waiving commercialism on professional health sites (26).

Methodological triangulation by using quantitative and complementary qualitative research has added to the consistency and internal validity of overall results (46).

Adolescents as early adopters of digital devices and applications (47) do less limit external validity in online research nowadays. Using reliable and valid measurement instruments enhanced internal validity. Recruitment above the age of 16 year might have limited external validity since acne already can manifest at the age of 12 (1,2). Although we recruited adolescents within heterogeneous groups, generalizability of study results might be limited. These limitations consisted of: most participants were 18 –19 year old, white, with mild acne severity, limited completed surveys, little OFG participants along with self-selection of participants. Future studies would need to target a larger more heterogeneous sample of adolescents to make findings more generalizable.

Conclusion

Dutch adolescents aged 16 years and older with mild acne mainly want to achieve a fast and total skin healing. In line with expressed needs we suggest the Skin House to develop a self –management program on an easy accessible website with relevant, accurate, short formulated and low-complex acne related information. Consultancy and attribution of professionals is recommended. Attention should be paid to reliability and trustworthiness of the website.

Recommendations

We recommend the assessment and development of quality criteria for national health websites and guidance of regular health professionals to reliable online information.

Funding

The Skin House enabled digital environment of OFG.

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Tables

Table 1: Treatment needs represented by dimensions

Dimensions:	Treatment needs like:
1. Reducing physical impairments	To be free of pain, free of itching, no longer have a burning sensation on the skin, to be healed of all skin alternations, to be able to sleep better.
2. Having confidence in healing	To have no fear that the disease will progress, to find a clear diagnosis and therapy, to have confidence in therapy.
3. Reducing impairment due to therapy	Needs to be less dependent on doctor and clinic visits, to have to spend less time with daily care, to have fewer out of the pocket treatment costs, to experience fewer side effects.
4. Reducing psychological impairments	Needs to be less depressed, to gain in joy of living, to be able to lead a normal everyday life, to be more capable in daily life, to be able to engage in normal leisure activities.
5. Reducing social impairment	Needs to be less of a burden to relatives and friends, to be able to have a normal working life, to be able to have more contact to other people, to dare to show oneself more, to be less burdened in partnership, to be able to have a normal sex life.
Two additional items:	Need to have a faster improvement of skin condition Need to regain control about disease.

Table 2: Topics Online Focus Group

Topics:	Semi-structured questions related to topic:
Educational needs	Which information do you need the most with respect to your acne? E.g What is acne, what are influencing factors, treatment options, when doctor's visits are recommended, and so on...? Can you indicate preferences regarding to format and persons to inform you?
Supportive needs	Can you describe your feelings regarding to acne? Do you actually share these feelings and experienced problems to others? Would you share these, and if so, can you indicate preferences regarding to format and persons.
Website preferences	What preferences do you have concerning format and content of a website about acne? What digital options are attractive to you? How do you rate contact options with professionals and / or peers, indicate preferences regarding individual or group related options?

Figure 1 Flowchart survey

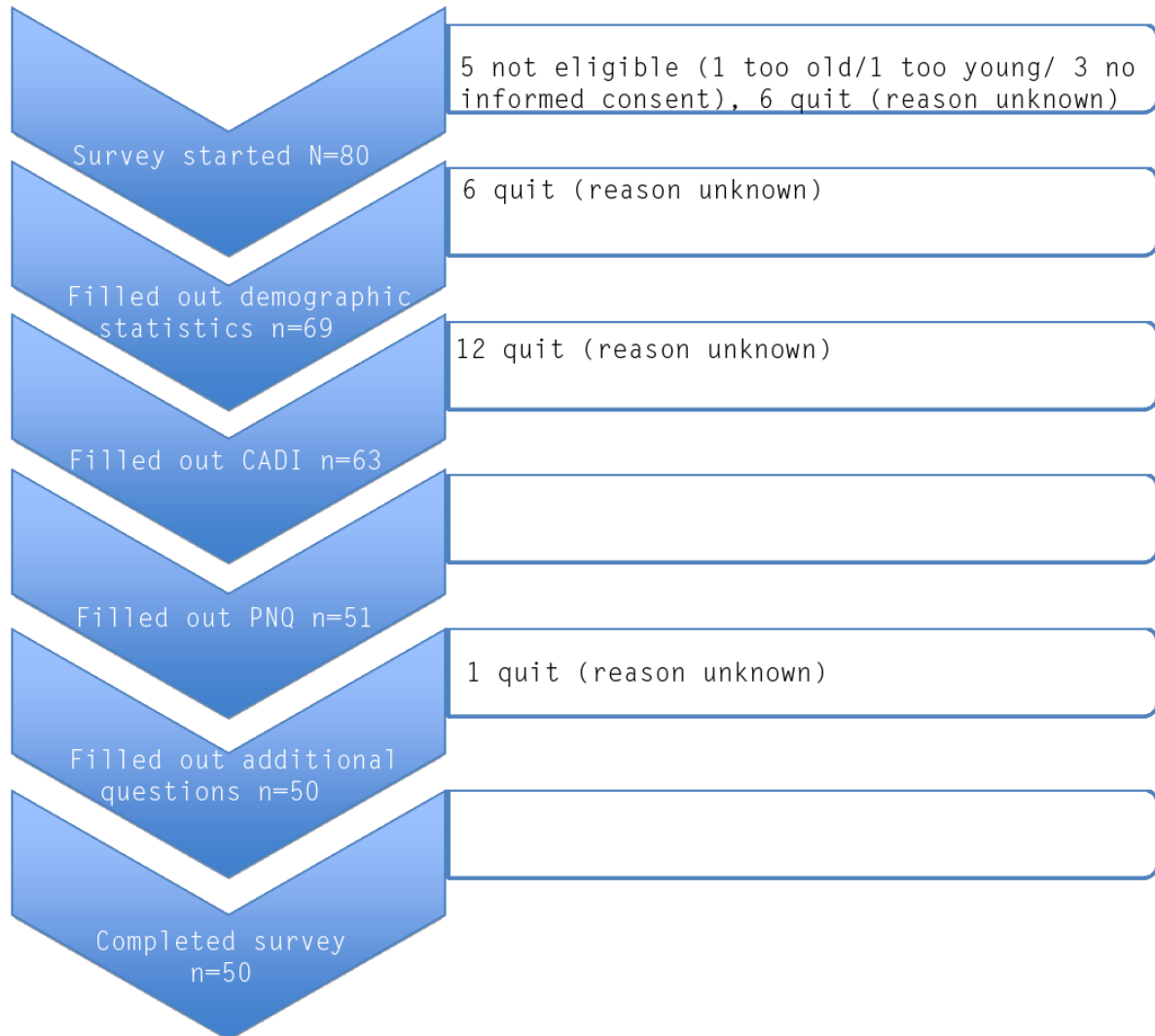


Table 3: Demographic statistics of survey

	All N=69 (100%)	Male N= 27 (39%)	Female N=42 (61%)
Age: Mean (\pm SD)	18,8 \pm 2,5	18,0 \pm 2,1	19,3 \pm 2,6
Skin colour (%) White	99	100	98
Actual Treatment (%) :			
None	73	78	69
Over the counter	17	7	24
Prescription General practioner	1	0	2
Prescription Medical specialist	9	15	5
CADI Mean (\pm SD) Range	2,6 \pm 1,8 0 - 6	1,4 \pm 1,5 0 - 4	3,3 \pm 1,5 0 - 6

These statistics also includes OFG participants.

Table 4: Means and standard deviations of PNQ dimensions and percentages of high agreement / does not apply to me, scaled from 0="not at all" to 4="very important", 5="does not apply to me"

	All: n=51			Male: n=21			Female: n=30		
	Mean ± SD	High Agree- ment (%)	N/A or 0 (%)	Mean ±SD	High Agree- ment (%)	N/A or 0 (%)	Mean ±SD	High Agree- ment (%)	N/A or 0 (%)
Dimension: Reducing physical impairments	2,4±1,4	49	17	1,9±1,6	43	33	2,7±1,1	53	7
Dimension: Having confidence in healing	2,1±1,6	41	31	2,0±1,8	43	38	2,1±1,5	40	27
Dimension: Reducing impairment due to therapy	1,7±1,5	33	29	1,4±1,6	24	38	1,9±1,5	40	23
Dimension: Reducing psychological impairments	1,5±1,5	24	35	1,6±1,6	24	38	1,4±1,5	23	33
Dimension: Reducing social impairment	1,5±1,5	24	35	1,3±1,5	19	52	1,7±1,4	27	23
All items	2,1±1,3	24	16	1,8±1,5	24	33	2,3±0,9	23	3

Means, standard deviations (SD) and percentage of high agreement on each item refer to the total number of respondents. Score "does not apply to me" were coded as 0. High agreements refer to percentages of mean scores >3 (referring to: 3 "important"/4 "very important" on scale score). N/A/0 refer to percentages of mean score of 0 (referring to "does not apply to me"/ 0="not important at all). Bold results indicate the two highest ranked results per group (all/male/female),

Table 5: Educational needs and support preferences

	All: N=51 High agreement (%)	Male: N=20(39%) High agreement (%)	Female: N=31(61%) High agreement (%)
Etiology/ Influencing factors	67	50	77
Information skincare /available products	78	55	94
Information professional treatment	63	55	68
To be able to chat with other acne patients	6	5	7
To be able to chat with a professional	24	25	23

Percentage of high agreement on each item refer to percentages of respondents who agreed on 3 "important"/4 "very important" with the items on the scale. Bold results indicate the two highest ranked results per group (all/male/female).

Table 6: Percentages of experienced actual educational and supportive resources

	All (N=50) (%)	Male N=20(40%) (%)	Female N=30(60%) %
Friends	46	35	53
Parents/family	80	80	80
Family practitioner	48	50	47
Medical specialist	18	15	20
Beautician	26	15	33
Skin therapist	14	5	20
Over the counter pharmacy	38	25	47
Pharmacy	36	25	43
Advertisement	28	25	30
Internet	40	30	47
Community	2	5	0

Bold results indicate the two highest ranked results per group (all/male/female).

Table 7: Demographic statistics of Online Focus Group

	Gender	Age	Treatment	CADI	PNQ				
					Dim 1	Dim 2	Dim 3	Dim 4	Dim 5
N=5									
# 1	Male	18	None	0	1,8	3,0	0,8	3,2	2,8
# 2	Male	18	Dermatologist	1	1,6	2,8	2,3	2,4	2,7
# 3	Female	18	None	5	4,0	4,0	3,5	0	3,0
# 4	Female	18	None	2	4,0	3,0	3,0	4,0	3,5
# 5	Male	16	None	2	3,0	0	0	1,0	0
Sumscore (Mean±SD)				2±1,9	2,9±1,2	2,6±1,5	1,9±1,5	2,1±1,6	2,4±1,4

Dim means dimension, Dimension1: Reducing physical impairments, Dimension 2: Having confidence in healing, Dimension 3: Reducing impairments due to therapy, Dimension 4: Reducing psychological impairments, Dimension 5: Reducing social impairments. Bold results indicate the two highest ranked group results.